Volume 3, Number 8 $3.50
Scholastic's Magazine for Today's Elementary Classrooms

TEACHING and computers

Published by Scholastic Inc. May/June 1986

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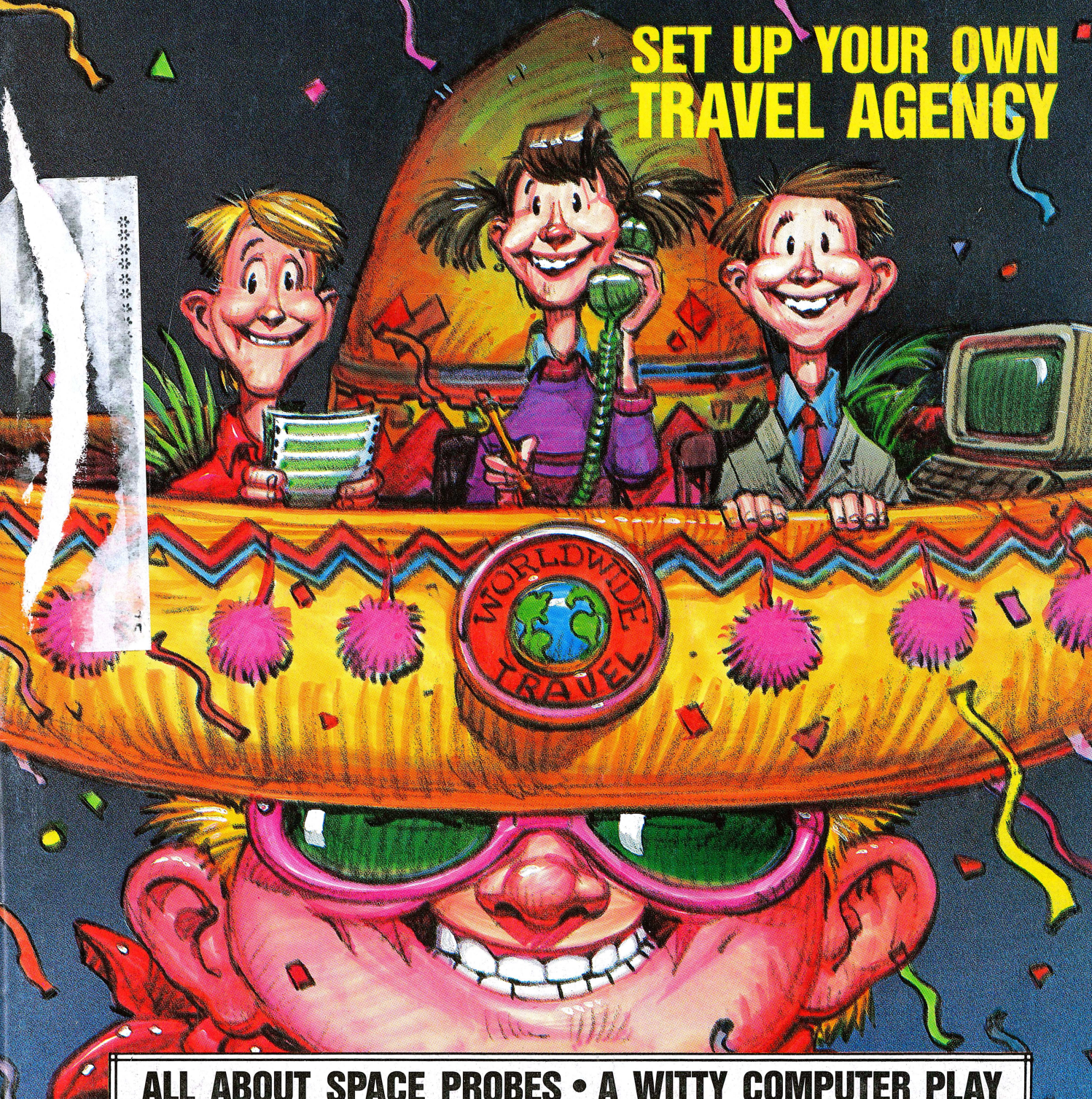

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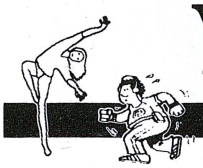

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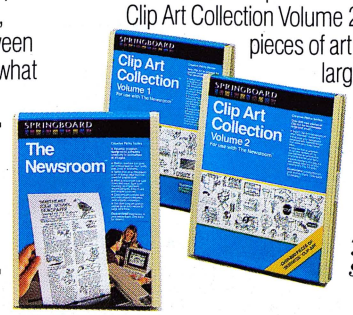

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May/June 1986 Vol.3, Issue 8

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Raise the curtain on computer drama with this witty new play. It's a high-tech takeoff of Lewis Carroll's *Alice in Wonderland.*

19 Space Probes
Take students on a simulated space probe mission to Jupiter, Saturn, Uranus, and Neptune! All you need is a version of Logo and this super science unit.

38 Worldwide Travel, Inc.
Do you have a data base software program? Then you've got what it takes to turn your classroom into a topflight travel agency. As employees of the agency, your students will come to possess the ultimate in international savvy!

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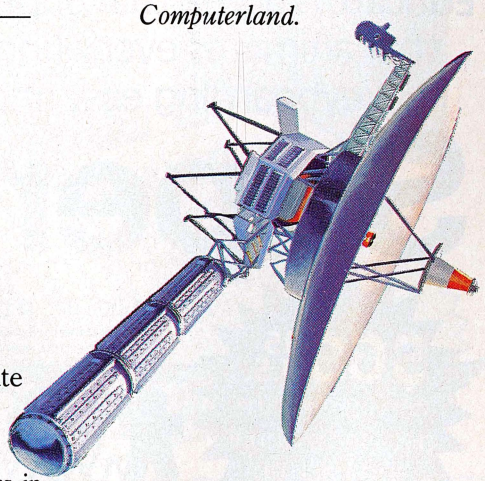

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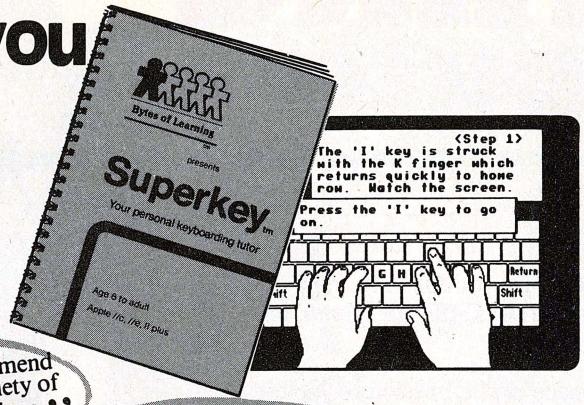
We wanted to be the first to tell you

why Superkey™ should be your personal keyboarding tutor, but others beat us to it...



"We strongly recommend Superkey for a variety of instructional settings."
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COMPUTERS IN EDUCATION

"This is an excellent typing tutor — set apart from other keyboarding tutors with the use it makes of high resolution graphics."
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TEACHING and computers

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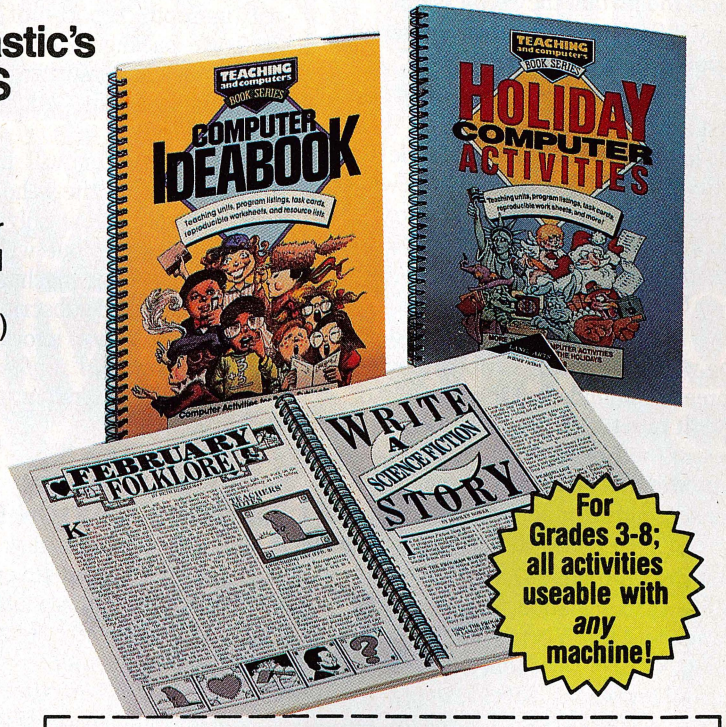

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Superintendent
Monte Bello School District

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And, the SwyftCard can do more. Just five commands allow information retrieval, calculation, telecommunication and assist in teaching programming. Just $67.50, each, in special school ten-packs; $89.95, singly. We'd like to point out, too, that SwyftCard was developed by Jef Raskin, father of the Macintosh project at Apple, and is endorsed by Steve Wozniak, the Apple II's creator.

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UPDATE

NEWS FOR COMPUTER-USING TEACHERS

NEWSLETTER OF SOFTWARE REVIEWS

Educational Software Report, a new biweekly software review newsletter for educators, will begin publication on September 8.

Each issue of *ESR* will include more than 30 reviews of recently released instructional programs. The programs will be reviewed by both a district level computer coordinator and a computer-using classroom teacher. Side-by-side comparisons of programs that meet similar instructional objectives will be provided, as will in-depth reports of field-tested software packages. *ESR* will also include news and information about developments in the educational software industry.

The newsletter will be published 18 times during the school year. Initially, it will review only Apple-compatible software, but will note when versions for other machines are available. A one-year subscription to *ESR* is $95. For more information, contact: *Educational Software Report*, P.O. Box 652, Lyndhurst, NJ 07071; 212/505-3000.

FREE SOFTWARE DEMONSTRATION DISK

A demonstration disk, which contains samples from seven educational software programs published by The Learning Company, is available free to school personnel.

The games on the disk, which teach reading, math, science, and basic thinking skills, are designed to work on Apple II series computers. Most are designed for ages five through 12. Two, however, *Rocky's Boots* and *Robot Odyssey*, remain a challenge through the adult level.

For a free copy of the disk for your school, write Demo Disk, c/o The Learning Co., Suite 170, Menlo Park, CA 94025.

FREE BROCHURE ON COMPUTERS AND SOCIAL STUDIES

A 16-page brochure, titled "How to Integrate Computers into the Social Studies Classroom," is available free to educators. It is recommended for those who teach social studies in grades five through 12, but it *does* contain some general information that is of use to any social studies educator.

Questions about how to find, evaluate, and take advantage of available computer resources are addressed. The booklet includes a reference section of materials, and articles on how others have integrated computers into the social studies classroom. For a copy of the brochure, write or call Tom Snyder Productions, 123 Mt. Auburn St., Cambridge, MA 02138; 617/876-4433.

ACADEMIC COMPUTER CONTEST

The fifth National Knowledge Master Open, a biannual academic event for junior and senior high school students who use Apple computers, is scheduled to take place on Wednesday, April 23, 1986.

The contest differs from other academic contests in that no travel is necessary — participants compete from their own schools. And, no limit is placed on team sizes. In past years, teams of from one person to 110 persons have entered.

Participating schools receive a software disk by mail. Complete contest rules and procedures accompany the disk.

The program on the disk will not run until a special password, given to entrants on the day of the contest, is entered. The password allows students one-time access to 200 questions derived from all secondary curriculum areas. Points are awarded based on speed and accuracy in answering the questions.

At the end of the contest round, which lasts approximately two hours, the computer displays a coded score. The score is phoned in to Academic Hallmarks, the sponsor of the contest, where it is compared against the other entries.

The entry fee, which includes the cost of the contest disk, is $30. The entry deadline is April 11. For more information, or to enter your school, contact Academic Hallmarks at 800/321-9218 or 303/247-8738. ■

Now that we've put more computers into the classroom than anyone else, there's only one thing left to do.

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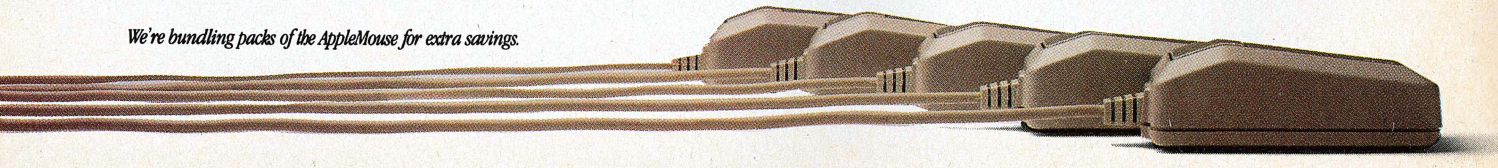
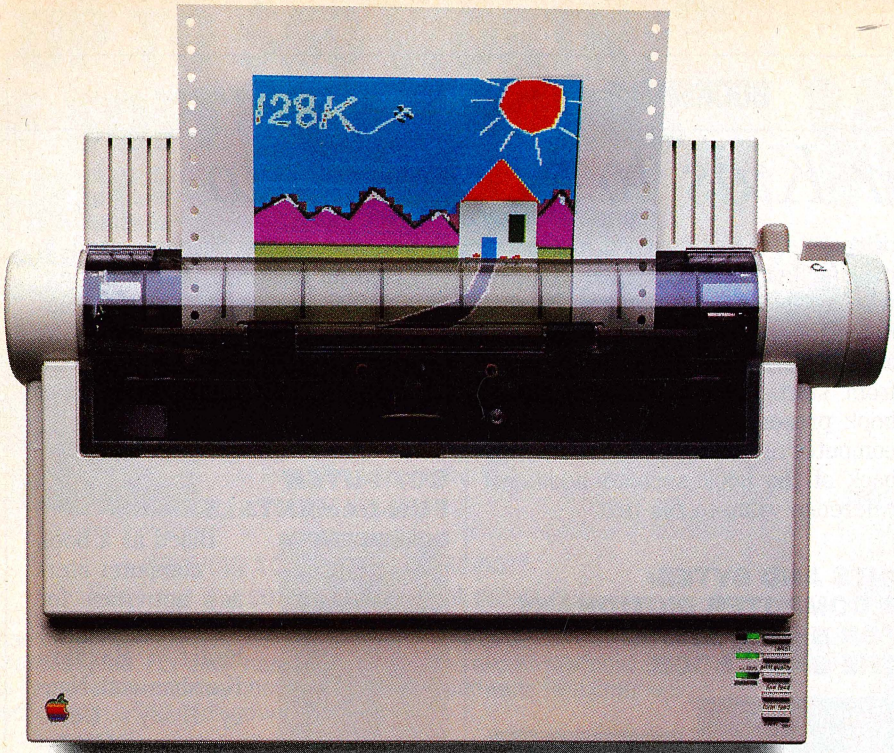
By taking all those Apple® computers you bought yesterday, and giving them the technology to meet your needs of today.

Upgrade your Apple IIe to 128K of memory, for example, and you have access to innovations like Scholastic's new Talking Text Writer, an interactive program that teaches kids to read and write. Or the 128K version of Bank Street Writer, which allows you to do a

We're bundling packs of the AppleMouse for extra savings.





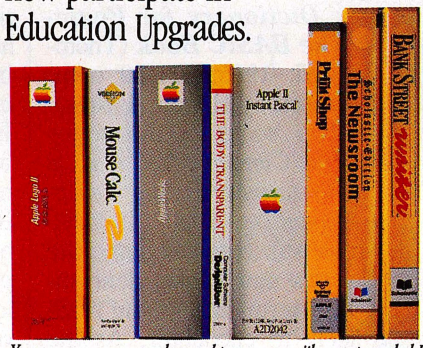
Your school can get the most out of its Apple computer system with the ImageWriter II printer. When combined with an Apple IIe or IIc, the ImageWriter II produces full color print-outs as well as near letter-quality text.

whole lot of things you couldn't do before, like use an 80-column display, boldfacing, underlining and streamlined printing functions.

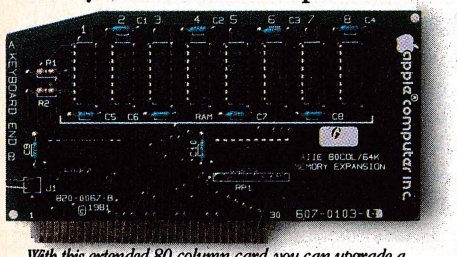
By using a 128K Apple IIe and an AppleMouse, you'll be able to run programs like MouseCalc and Instant Pascal that give the IIe many of the same user-friendly features as that most friendly of personal computers, Macintosh.™

Hook our Apple ImageWriter™ II printer to your Apple IIe and you'll be able to print near letter-quality text. As well as full color print-outs of your student's work. So they can take home pictures and stories like the one shown here (created with The Bank Street Storybook by George Brackett).

There are three ways you can now participate in Education Upgrades.



You can run many enhanced programs with an upgraded IIe.



With this extended 80-column card, you can upgrade a IIe to 128K of memory and 80 columns of text.

First, you can expand the 64K Apple IIe you have right now by taking advantage of our specially priced extended 80-column cards (each of which gives you 80-columns of text and lets you double the memory of the IIe from 64K to 128K), as well as mice and printers.

Second, we've made our most popular systems even more affordable, and also added three new specially priced systems: Our basic printer system, which includes the 128K IIe with UniDisk™ 5¼ (our standard external disk drive), an Apple Monitor II and an ImageWriter II printer.

Our color printer system, comprised of the 128K IIe, UniDisk 5¼, ImageWriter II and Color-Monitor II makes computer learning even more attractive to kids.

And our Administrative system, which includes the 128K IIe, 256K memory expansion card, UniDisk 3.5 storage device that stores over five times as much information as you can currently, UniDisk 5¼, Catalyst software, and an ImageWriter II.

Finally, we're taking trade-ins. Up to $250 credit toward the purchase of a new Apple computer in exchange for your Apple II, II+, or III, as well as certain models from IBM, Commodore, Tandy and other manufacturers. Your local Apple education representative or authorized Apple dealer will give you all the details.

We're that anxious to ensure that schools everywhere get the very most out of their Apple computers.

After all, our goal is to stay in school forever.

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Books for Kids to "Byte" Into

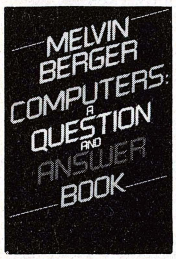
BY CANDY COLBORN

These nonfiction selections for your children's bookshelf offer angles on computer science not found in regular texts.

COMPUTER KIDS

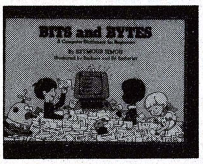
In ***Computer Kids*** (Dodd, Mead & Co.; 1984; $10.95) George Sullivan lets kids speak for themselves about why they like computers. He interviewed eight boys and girls, ranging in age from 11 to 16, and asked them how they became interested in computers, and what advice they would offer those being introduced to computers for the first time. The interviewees encompass a broad spectrum of interests and abilities. Two are members of the Atari Youth Board. (The Board offers advice on hardware and software to the people at Atari who design computer equipment.) Another is an expert on the subject of computer security. Many of the interviewees use their computer skills to earn money while going to school. These "computer kids" can act as positive role models for other kids with an interest in computers.

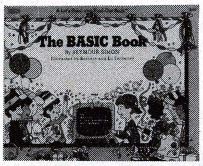
COMPUTERS: A QUESTION AND ANSWER BOOK



Melvin Berger tackles the whats, wheres, hows, and whys of computer technology in ***Computers: A Question and Answer Book*** (Thomas Crowell; 1985; $11.50). In the first of six chapters, "What Is a Computer?" Crowell explains elements of a computer, from the printer, to bits, bytes, and binary numbers. How computers work is the subject of Chapter 2. Programming and programming languages; computer applications; the history of computers; and the future of computers are covered in the remaining four chapters. The volume, with its question and answer format (used throughout), is aimed primarily at browsers age 10 and up. If read from start to finish, however, the book presents a logical overview of computer technology. An index at the back of the book supplies additional reference value to the text.

BITS AND BYTES: A COMPUTER DICTIONARY FOR BEGINNERS & THE BASIC BOOK





There are two new additions to Seymour Simon's "Let's-Read-and-Find-Out" books about computers for ages five to nine: ***Bits and Bytes: A Computer Dictionary for Beginners*** and ***The BASIC Book*** (Thomas Y. Crowell; 1985; $11.50 each; $3.95 paperback by Harper & Row). The first two books in the series were *Meet the Computer* and *How to Talk to Your Computer* (See *Teaching and Computers*, Sept., 1985 issue, for reviews). *Bits and Bytes*, the first of the two new books, demystifies computer terms that young readers are likely to encounter. As the introduction states, readers will, by the book's conclusion, be able to use (and understand) such sentences as "I had a backup of the program and didn't lose any data." Primary grade computer buffs will have this book memorized the same week they find it on the shelf. *The BASIC Book*, Simon's other new work, uses the occasion of a birthday surprise for a seven-year-old named Adam to explain BASIC programming commands. Adam's friends use PRINT, NEW, RUN, LIST, GOTO, FOR. . .NEXT, and INPUT statements to write a birthday message on their science club computer. Young readers may get lost when the more complex commands are explained. They also may have trouble understanding the dialogue used in the colorful drawings (written, inexplicably, in cursive instead of manuscript). The format, however, is so appealing, that young readers are likely to persevere until they have mastered the concepts.

COMPUTER FUN-DAMENTALS

Billed as a book of "computer literacy activities for kids and kids at heart," Barbara Kurshan and Nancy Healy's ***Computer FUNdamentals*** (Reston; 1984; $16.95) differs from other books in this month's column in that it is an interactive text. Intended for nine- to 14-year-olds and their parents to enjoy together at home, *Computer FUNdamentals* can also be a valuable classroom tool. Literacy activities are divided into four sections: the history of computers and how they work, logical thinking used by computers, computer programming, and computer applications. Each activity or project is preceded by an introduction, a list of necessary materials, additional related activities, and even a suggestion on the best time to try an activity (for example, "when you are imagining places long, long ago"). Not all the activities require a computer. There is an answer key at the back of the book, as well as a list of resources. The worksheets provided are consumable—no permission is granted to copy them.

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Thomas Crowell Junior Books, 10 E. 53 St., New York, NY 10022.
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Candy Colborn is a media specialist at Cottonwood Creek Elementary School in Englewood, CO.

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Books for K

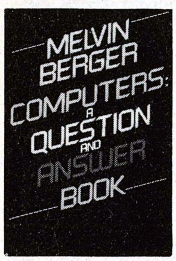
BY CANDY COLBORN

These nonfiction selections for your children's bookshelf offer angles on computer science not found in regular texts.

COMPUTER KIDS

In ***Computer Kids*** (Dodd, Mead & Co.; 1984; $10.95) George Sullivan lets kids speak for themselves about why they like computers. He interviewed eight boys and girls, ranging in age from 11 to 16, and asked them how they became interested in computers, and what advice they would offer those being introduced to computers for the first time. The interviewees encompass a broad spectrum of interests and abilities. Two are members of the Atari Youth Board. (The Board offers advice on hardware and software to the people at Atari who design computer equipment.) Another is an expert on the subject of computer security. Many of the interviewees use their computer skills to earn money while going to school. These "computer kids" can act as positive role models for other kids with an interest in computers.

COMPUTERS: A QUESTION AND ANSWER BOOK



Melvin Berger tackles the whats, wheres, hows, and whys of computer technology in ***Computers: A Question and Answer Book*** (Thomas Crowell; 1985; $11.50). In the first of six chapters, "What Is a Computer?" Crowell explains elements of a computer, from the printer, to bits, bytes, and binary numbers. How computers work is the subject of Chapter 2. Programming and programming languages; computer applications; the history of computers; and the future of compute
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CLASSROOM HAPPENINGS

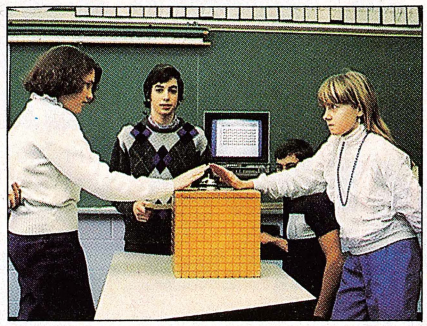
BY LESLI ROTENBERG

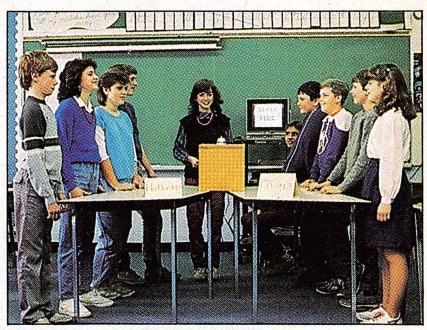
COMPUTER GAME SHOW

In teacher Brad Cott's eighth grade classroom, students become contestants in a computerized version of *Family Feud,* and in the process, receive an excellent review of material they have studied in class. Brad, a teacher at Innerkip School in Woodstock, Ontario, wrote a computerized version of the popular television show so that the questions in the game cover material students are currently learning. Called *Class Feud,* Brad's program runs on Commodore 64 computers.

To play *Class Feud,* students form several teams of four or five members. One team is appointed to survey the rest of the class on a topic students are studying. Surveys must contain open-ended questions, each having several possible answers. For example, a question on ecology might ask "What is a form of pollution?" *(Answers include air, water, soil, solid wastes, radiation, acid rain, and noise.)*

Once the surveys are completed, the survey team collects and tabulates them, establishing the top six or seven responses for each question. The students then enter the questions and the top answers, ranked from most popular to least popular, into the computer.





Brad Cott

Students face off in the computerized version of a popular TV game show.

Now the feud begins. The survey team acts as moderators during the game: two of its students ask contestants the questions. The other two operate the computer, matching the contestants' responses with a printout of the most popular answers, and pressing keys so that an appropriate response appears on the screen. The other student teams choose family names, such as the Hatfields or the McCoys. Two teams compete at a time. Each team appoints a member to act as spokesperson. The spokespersons from the two competing teams stand in front of a bell, facing each other. A moderator then asks one of the questions, and the first student to ring the bell responds.

If contestants name one of the top six or seven responses from the survey, student moderators see that the response appears on the computer screen along with its popularity ranking. Incorrect responses (those not included in the top six or seven) elicit a flashing "X" and a disapproval noise from the computer. Like the families on the TV show, teams take turns trying to name all the top answers. The team that earns the greatest number of correct responses wins.

If you'd like a copy of *Class Feud* for Commodore 64 computers, send $10 to cover the cost of the disk, program instructions, and postage to Brad Cott, 1101 Devonshire Avenue, Woodstock, Ontario N4S 5S1.

Dan Weber

Fourth graders enliven fairy tales with Logo art and costumes!

MODERN FAIRY TALES

The Pied Piper, The Princess and the Pea: these stories were familiar to the audience at Montclair Kimberley Academy's fourth grade performance in Montclair, New Jersey. But the way the fairy tales were told was unique. While pairs of students recounted tales, their original computer graphic illustrations, programmed in Logo, flashed on the screens beside them. Kids dubbed their production "The LogoShow!"

Each pair of students selected a fairy tale to retell and illustrate with Logo. The students used their own words to write the text for their stories in a "dummy" book. On each page of the book, they designed a picture to illustrate the text. Then they used Logo to transfer their designs to the computer screen.

On show day, students dressed up as characters from their fairy tales. The "LogoShow" took place in the school gym where 16 computers were arranged on numbered tables, two per table. Visitors, including the school's 200 students, their teachers, and many parents, were divided into eight groups and assigned a starting position (table number).

At each table, visitors heard two fairy tales. After both stories were completed, one performer at each table raised a "turtle sign," a large oak tag turtle attached to a yardstick. When all eight turtle signs were raised, one of the students played a few notes on a xylophone to signal everyone to rotate one position clockwise for the next two stories.

Many kids went above and beyond the call of duty, incorporating songs and character voices into their tales. ■

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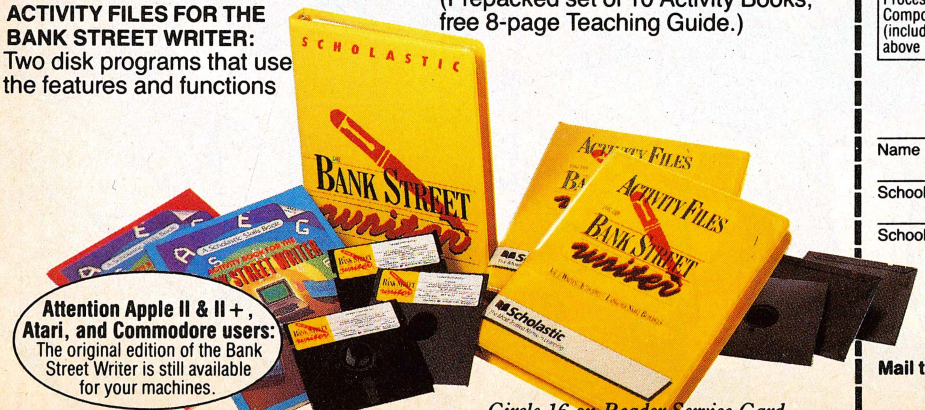

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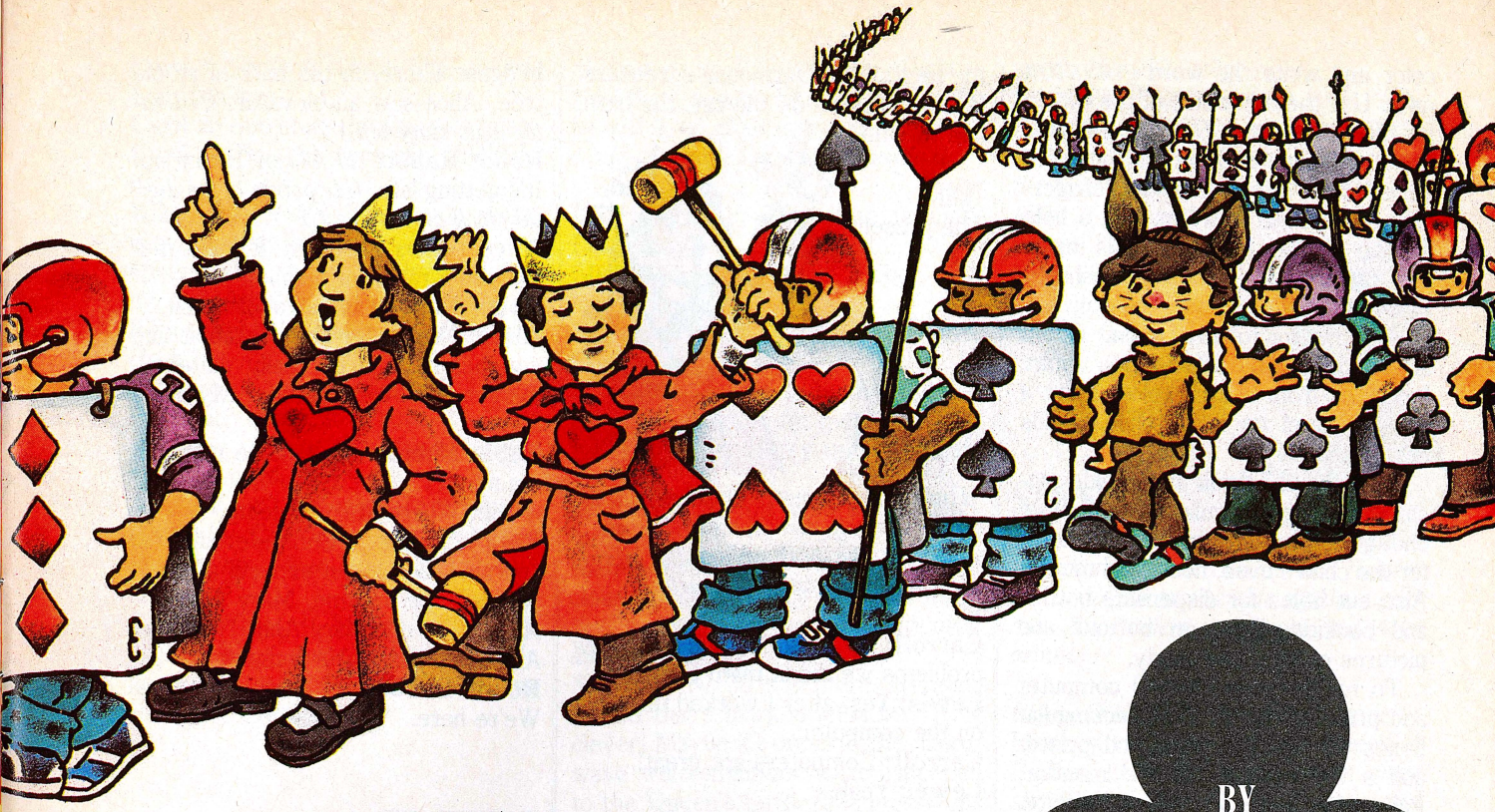

BY
ILENE ROTH
AND
LEAH ROTH

ALICE IN COMPUTERLAND

A PLAY FOR INTERMEDIATE GRADES

CHARACTERS

Alice	Refrigerator
Lewis	Microwave Oven
Carroll	Drink Machine
Robot Rabbit	Cookie Machine
Queen of Hearts	Mad Hatter
King of Hearts	March Hare
Dutchess	Dormouse
Knaves	Cheshire Cat
Cards	Short Alice
Guards	Narrator
Humpty Dumpty	

You can adjust the size of the cast by increasing or decreasing the number of Knaves, Cards, and Guards. Animal parts can be played by children of either sex.

In this take off on Lewis Carroll's *Alice in Wonderland*, Alice falls asleep and wakes up in a strange land where she learns the importance of computers in everyday life.

PROPS

You will need: paper bushes and flowers, a cardboard elevator, a shoe box painted to resemble a door, a cardboard sign that says TO OPEN KITCHEN DOOR, PRESS BUTTON, a drink machine, cardboard signs that say PRESS UP BUTTON FOR TALL DRINK and PRESS DOWN BUTTON FOR SHORT DRINK, a soda bottle, a cardboard refrigerator, a flashlight, a cardboard microwave oven, a cookie machine, cardboard signs that say PRESS HERE FOR LARGE COOKIE and PRESS HERE FOR SMALL COOKIE, a large cookie, a stool, loose video tapes, a joystick, cardboard signs that say START and CANCEL, croquet mallets, a table, six chairs, a cardboard computer and printer, invitations, teacups and saucers, a teapot, a tray of tarts, a long roll of computer paper, a floor-length tablecloth, and a xylophone to play musical scales.

Use one cardboard refrigerator carton for the elevator and the refrigerator. Keep the carton vertical for the elevator. Slit the edges on three sides to form a door. Paint it a dark

(continued)

Little Apple Art

color and write the word ELEVATOR on it. Use the other side of the carton for the refrigerator. Seal the elevator door with tape and slit the opposite edges of the box to form the refrigerator door. Paint it white. Cut a hole for the handle. A child stands inside the carton and shines a flashlight through the hole.

For the microwave oven, use a small cardboard carton on a table. Paint the front a dark color. Paint a control panel on it. A child stands behind the carton.

To make the drink and cookie machines, use rectangular cartons large enough to fit a child inside. Cut holes for the child's eyes, nose, and mouth. Also cut holes for dispensing bottles and cookies. Paint on buttons and pictures of soda and candy.

To make the cardboard computer and printer, use shallow, rectangular boxes for the keyboard and printer and a square box for the monitor. Paint the boxes brown or white. Then paint keys on the keyboard and a black screen on the monitor. Make slots on top of the printer where paper can be inserted.

COSTUMES

Dress Robot Rabbit in white. Paint a digital display window on both sides of a 5" x 7" piece of cardboard. Paint 3:00 on one side and 6:00 on the other side, so the display can be reversed to show a later time at the end of the play. Attach a cord to hang the clock around Robot Rabbit's neck. Make rabbit ears with aluminum foil or cardboard. Attach them to the top of a beret or floppy hat with masking tape.

Alice and Short Alice wear matching contemporary clothes. The Queen, King, Dutchess, Knaves, and Guards dress in white or red with paper hearts attached to their costumes. The Cards wear large white pieces of posterboard, sandwich-style. Paint each set of posterboard with a large red heart or diamond, or a large black club or spade.

Dress the Cheshire Cat in a beret and orange and black clothes. Humpty Dumpty wears a bow tie and black and white clothes. The Mad Hatter wears a large top hat and black clothes. The March Hare dresses in brown and wears cardboard ears attached to a beret or floppy hat. The Dormouse wears gray clothes. Pin a tail made of white clothesline wire to the back of the Dormouse's trousers. Pencil whiskers on the cat, the hare, and the mouse.

TIME

The present.

SCENE I

In The Park

Bushes and flowers are scattered about. Carroll, Lewis, and Alice are sitting in the park. Narrator stands stage left, in front of the curtain.

Carroll: Do you understand the new problems we did in math today?
Lewis: Yes, after I worked them out on the computer.
Carroll: Computers are great!
Lewis: Yeah.
Alice *(yawns)*: Can't you two ever talk about anything besides computers? Computers aren't so important in our lives.
Narrator: Lewis and Carroll just couldn't stop talking about computers. So Alice, bored with their conversation, stretched out on the grass and fell asleep. *(Narrator exits stage left. Lewis and Carroll pantomime talking. They notice Alice is asleep and quietly exit stage right. Alice wakes up, stretches, looks around.)*
Alice: I guess I fell asleep. Lewis and Carroll must have gone home.
Robot Rabbit *(enters through the audience)*: Oh my disks and cursors, I mustn't be late. The Queen will have my head. Won't she be mad if I keep her waiting! She'll cancel my program. *(He looks at the digital clock on his chest.)* Oh my disks and cursors, I'm late. *(He exits stage right.)*
Alice: A talking rabbit! Or was it a talking robot? I must follow him and find out. *(She exits stage right.)*

SCENE II

In Another Part of the Park

An elevator is center stage. Its door is open, and Robot Rabbit is inside. Bushes and flowers are scattered about. Narrator stands in front of the curtain, stage left.

Narrator: Alice's curiosity led her past a clearing and through a row of hedges. There, in the bark of an old tree, Alice saw an elevator. *(Narrator exits stage left.)*
Robot Rabbit *(to Alice)*: Hurry up! It's getting late. *(He points to the digital clock on his chest.)*
Alice *(enters elevator)*: Excuse me, are you a rabbit or a robot?
Robot Rabbit: I'm a robot rabbit.
Alice: I've never seen a rabbit like you before. You're really quite remarkable. How do you do? My name is Alice.
Robot Rabbit: No time to talk. I'm in a hurry.
Alice: Where are you going?
Robot Rabbit: Computerland, of course. The Queen expects all computers to be on time, Mary Ann.
Alice: I'm not Mary Ann. I'm Alice. And I'm a girl, not a computer.
Robot Rabbit: No time to argue. We're here.

SCENE III

In Computerland

Robot Rabbit and Alice enter stage left. Robot Rabbit rushes ahead of Alice and stands at attention. The Queen enters stage right. Cards and Guards enter behind her.

Queen *(upset)*: Oh my bytes and menus, somebody stole my tarts. *(She notices Alice and points to her.)* I never saw that robot before.
Alice: I'm not a robot. My name is Alice.
Robot Rabbit: She's a girl, Your Highness.
Queen: You stole my tarts.
Alice: In the first place, I just got here. And in the second place, you have no right to accuse me!
Queen *(shouts)*: Wrong! In the first place, my tarts are missing. And in the second place, nobody leaves Computerland until my tarts have been found. *(She points at Alice.)* You are my chief suspect, so it's up to you to search for them. Answer my question!
Alice: But you didn't ask a question.
Robot Rabbit: The question is: How did you get here?
Queen: Exactly!
Alice *(to Robot Rabbit)*: You know how I got here. I rode with you in the elevator. And I'm beginning to wish I never came here.
King *(enters stage left)*: What's going on?

Card 1 *(points to Alice)*: She's a girl, Your Majesty.
Card 2: She stole the Queen's tarts.
Card 3: But she says she didn't do it.
King *(to Alice)*: Then you must prove it, my dear.
Queen: You have one hour to find my tarts or else! I'll set the timer on Robot Rabbit's computer. *(She sets clock.)*
Everyone *(circle around Alice)*: Prove it! Prove it! Prove it! *(They exit stage right as they chant, leaving Alice on stage.)*
Alice: I don't know where to start.
Cheshire Cat *(leans out from behind the curtain, stage left)*: Start in the kitchen.
Alice: What? *(Cheshire Cat disappears. Alice looks around.)* He's gone! What a curious place! *(She exits stage left. Curtain.)*

SCENE IV

Outside the Royal Kitchen

Kitchen door is in front of the curtain. Alice enters stage right and notices it.

Alice: What a cute little door. There's a tiny sign on it. *(She kneels to read the sign.)* TO OPEN KITCHEN DOOR, PRESS BUTTON. Here goes. *(She presses the button and the door opens.)* Goodness! The opening is so small. I couldn't possibly fit through.
Cheshire Cat *(enters stage left, pushes out a drink machine)*: Try this. *(He disappears behind the machine.)*
Alice: He pops in and out so fast! Here's another sign. *(She reads the sign.)* PRESS UP BUTTON FOR TALL DRINK. PRESS DOWN BUTTON FOR SHORT DRINK. I don't understand how a drink will get me through that tiny door, but I am a little thirsty. *(She presses the down button. A drink comes out. She sips it.)* Delicious! *(The stage lights go out. Alice slips behind the curtain stage left.)* Oh my goodness, I'm shrinking! *(Music goes downscale.)*

SCENE V

Inside the Royal Kitchen

Curtain opens. A microwave oven and a refrigerator are center stage. The microwave is on a table. The refrigerator's door is open and a light is blinking inside. Short Alice walks toward it. A stool is downstage left, a pile of tangled videotape beside it.

Refrigerator: My door is ajar. Please close it.
Short Alice: How can a door be a jar? Ridiculous!
Refrigerator: Close the door, please.
S. Alice: Before I do that, please answer a question for me.
Refrigerator: Hurry up! I'm losing my cool.
S. Alice: Do you have the Queen's tarts?
Refrigerator: No. Now hurry and close my door. *(Alice closes the door, then walks toward the microwave oven and looks inside.)*
S. Alice: No tarts in there. Here's a button that's marked MEMORY. How clever! Maybe if I press it, the microwave will remember what happened to the Queen's tarts. *(She presses the button.)* What do you remember about the Queen's tarts?
Microwave Oven: Tarts: Baked at 12 o'clock noon. Medium heat for 10 seconds. Removed by Queen.
S. Alice: Hmmm...then the tarts must have been stolen sometime in the afternoon.
Cheshire Cat *(enters stage right, pushes out a cookie machine)*: Any luck, Alice? *(He disappears behind the machine. Humpty Dumpty enters stage left and sits on the stool.)*
S. Alice: The tarts are not in the kitchen. Where else can I look?
Humpty Dumpty: At me!
S. Alice *(surprised)*: Oh, I know you. You're...
Humpty Dumpty *(leans forward to bow)*: . . .Humpty Dumpty.
S. Alice: Be careful, you'll fall.
Humpty Dumpty: Perhaps my video camera recorded the theft. I'll look through my tapes. *(He pulls up yards of tangled tape.)* It must be here somewhere.
S. Alice: Thank you, but I can't wait. I only have an hour to find the tarts.
Humpty Dumpty: I was just trying to be a good egg. *(Alice walks center stage. Cheshire cat pops up from behind the cookie machine.)*
S. Alice: How do I get tall again? The drink machine is outside.
Cheshire Cat *(points to cookie machine)*: Large cookies make you grow tall. Small cookies make you grow small. *(He exits stage right.)*
S. Alice: There he goes again. *(She reads the sign on the machine.)* PRESS HERE FOR LARGE COOKIE. *(She presses the button and gets a large cookie. She takes a bite and puts the rest in her pocket. The stage lights go out. Music goes upscale. Curtain.)* There, that's better. I'm my normal size again.

SCENE VI

The Palace Garden

Curtain opens. Bushes and flowers are arranged to resemble a palace garden. Alice enters stage right and looks around.

Robot Rabbit *(rushes in, stage left)*: Make way for the King and Queen of Hearts. *(The King and Queen enter stage left, followed by the Knaves and Guards. The Queen carries a joystick. The Knaves carry signs. The King carries a croquet mallet.)*
Queen *(claps her hands to summon the cards)*: Playing cards! *(Cards enter stage left. They march around the stage, shifting places and weaving zigzag patterns, then close ranks. Alice gets caught in the shuffle. The Queen spots her.)* Guards, arrest that girl! She stole my tarts.
Alice: Wait! You gave me an hour to find the tarts. My time is not up yet.
King *(to Queen)*: That's right, my dear. Let her go. *(The Dutchess enters stage right, carrying a croquet mallet.)*
Dutchess *(takes Alice from the guards)*: Would you like to play croquet, my dear? Cards, take your places. *(Pairs of cards form wickets by facing each other and joining their arms in an arch shape.)* The Queen will work the joystick.
Alice: Joystick? What kind of a croquet game is this?
King: Computer croquet, of course.
Queen: Let the game begin. *(Cards make video game sounds.)*
Alice *(shouts over noise)*: What's the object of this game?
Queen: To get YOU! *(She laughs hysterically.)* Start! *(Knave #1 kneels and holds up a START sign. The Dutchess chases Alice through the wickets. Cards move back and forth, trying to make it difficult for Alice to escape.)*

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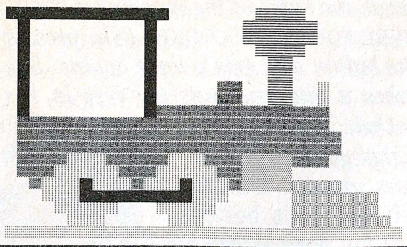

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Alice: Oh my goodness, I've got to get to that CANCEL sign. *(She manages to get to Knave #2 and pushes him to his knees. He holds up a CANCEL sign. Knave #1 stands. Everyone freezes and the stage lights go out. Curtain.)*

SCENE VII

A Clearing in the Forest

Curtain opens. Bushes and flowers are arranged differently from the previous scene. The March Hare and the Dormouse enter stage right. They push out a table set for a tea party. A computer and a printer are on the table. Underneath the table and hiding under the tablecloth, a child pushes invitations through the slit on the printer. The Mad Hatter enters behind them, pushing out several chairs.

Alice *(tries to help the Mad Hatter with the chairs)*: Let me help.
Mad Hatter: Go away! Don't bother us.
Alice: That's rude.
March Hare: True.
Dormouse *(yawns)*: Our word processor is printing out invitations to the Queen's surprise tea party. *(He falls asleep. The printer spits out invitations. Alice picks one up.)*
Alice *(reads)*: THE QUEEN'S TARTS WILL BE SERVED. *(She points to the three characters on stage.)* You stole the Queen's tarts!
March Hare: We couldn't very well ask the Queen to give them to us. What kind of a surprise would that be? *(He hands Alice a bunch of invitations.)* Here. Deliver these!
Alice: This is crazy!
Dormouse *(yawns)*: Crazy ... crazy . . .crazzz-z-z-z. *(He drifts off to sleep again. Robot Rabbit enters through the audience. He rushes on stage.)*
Robot Rabbit: Ten, nine, eight, seven, six, five, four, three, two, one. Time! *(The Queen, King, Dutchess, Knaves, and Cards enter through the audience. One knave carries stream of computer paper.)*
Dutchess *(points to Alice)*: There she is!
Queen: Arrest her! *(The guards try to grab Alice.)*
Alice: No! No! I found your tarts, Your Majesty. *(She points to Dormouse, March Hare, and Mad Hatter.)* They stole your tarts.
Dormouse, Hare, and Hatter *(shout)*: Surprise!
Dormouse: We planned this surprise party just for you, Your Majesty. *(He yawns.)*
Queen: What a lovely thing to do! *(Stage lights go out. Everyone exits except Alice, the Queen, Robot Rabbit, and one Knave. After a brief pause, the stage lights go on.)* That was a delicious party.
Alice: Yes, it was. And now I'd like to go home, please, Your Majesty.
Queen *(annoyed)*: Well, go!
Alice: Could you help me, Your Highness?
Queen: Oh bytes and menus, you don't need help. You only need to work at least three computer-operated machines to be allowed to leave Computerland.
Alice: But I don't know how to work a computer.
Queen: Nonsense. You've been working computers since you arrived here with Robot Rabbit.
Alice *(puzzled)*: I didn't work any computers.
Queen *(shouts)*: Untrue! You operated many machines that use computers. Knave, show Alice the computer printout. *(The Knave unrolls a long stream of computer paper.)*
Robot Rabbit *(reads)*: ALICE WORKED THE FOLLOWING MACHINES THAT USE COMPUTERS: REFRIGERATOR, MICROWAVE OVEN, DRINK MACHINE, COOKIE MACHINE, COMPUTER GAME....
Alice: I did use computers, didn't I? I never realized that those machines use computers. I operate those machines and many others at home like telephones, dishwashers, washing machines, and... I guess computers are important in our lives.
Queen: Yes...yes...and...
Alice *(interrupts)*: I can't wait to tell my friends about this, but I still don't know how to get out of Computerland.
Queen: The way you entered is the way you leave. Follow Robot Rabbit.
Robot Rabbit *(looks at his digital clock)*: Oh my disks and cursors, I mustn't be late. *(To the Queen)* I'll see you later with important data. *(To Alice)* Hurry if you're coming, Mary Ann. *(Alice follows Robot Rabbit. They exit stage right.)*
Alice: I told you my name is Alice.
Queen: Knave, hand me that last tart. *(Stage lights go out. Curtain.)*

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Supplementary Activity:

ALICE IN COMPUTERLAND

After performing the "Alice in Computerland" play on the previous pages, have your students try these related word processing activities. First, they correct misspelled words in an invitation to the Queen of Hearts' surprise party. Then they write their own party invitation. In the process, children learn how to write an invitation and get to practice spelling and word processing skills.

Materials: Word processing program, a data disk with the file called INVITE, the task card at right, and one storage disk per child.

Preparation: Using your word processing program, type the invitation in the box on this page exactly as it appears (misspellings and all). Type only the invitation. Do not type the material in italics that labels its parts. Save the invitation on a data disk under the name INVITE.

Cut out and laminate the task card below. Before you assign this task card to students, discuss the seven parts of a party invitation. (These parts are labeled in the box on this page.) Explain that besides the necessary information about *why*, *who*, *where*, and *when*, the type of clothing or "attire" should be indicated, along with some hints about special events. An RSVP (*Répondez S'il Vous Plait*, French for "please reply") asks the guests to let you know if they plan to attend.

Task Card Activities: Have students follow the directions on the task card. The card will tell them to call up the INVITE file and examine a written invitation to the Queen of Hearts' surprise party. The invitation contains eight misspelled words. Students use word processing commands to correct the spelling errors. Then they use the corrected invitation as a model to write their own party invitation.

Misspelled words: tee (tea), Harts (Hearts), howse (house), darts (tarts), Hair (Hare), Joone (June), crokay (croquet), and muzic (music).

ALICE IN COMPUTERLAND
TASK CARD

IT'S PARTY TIME!

Activity 1

The March Hare typed the Queen of Hearts' surprise party invitation on a computer. Unfortunately, the hare is a poor speller and the invitation contains eight misspelled words.

1. To fix the misspelled words, (a) boot up your word processing program, (b) ask your teacher for the data disk that goes with this card and load it, (c) then call up the file called INVITE.
2. Now read the invitation. Use the INSERT, DELETE, and MOVE commands on your word processing program to correct the misspellings. Remove the data disk and save your work on a blank disk.

Activity 2

You had such a great time at the Queen's party that you want to give your own party.

1. Using your word processor and the data disk from the last activity, call up the INVITE file.
2. Now change the invitation so that you are the host or hostess. You'll need to choose a theme or "why" for your party. You'll also need to change the place, the date and time, the RSVP phone number, and the special events. Save your invitation on a blank disk.

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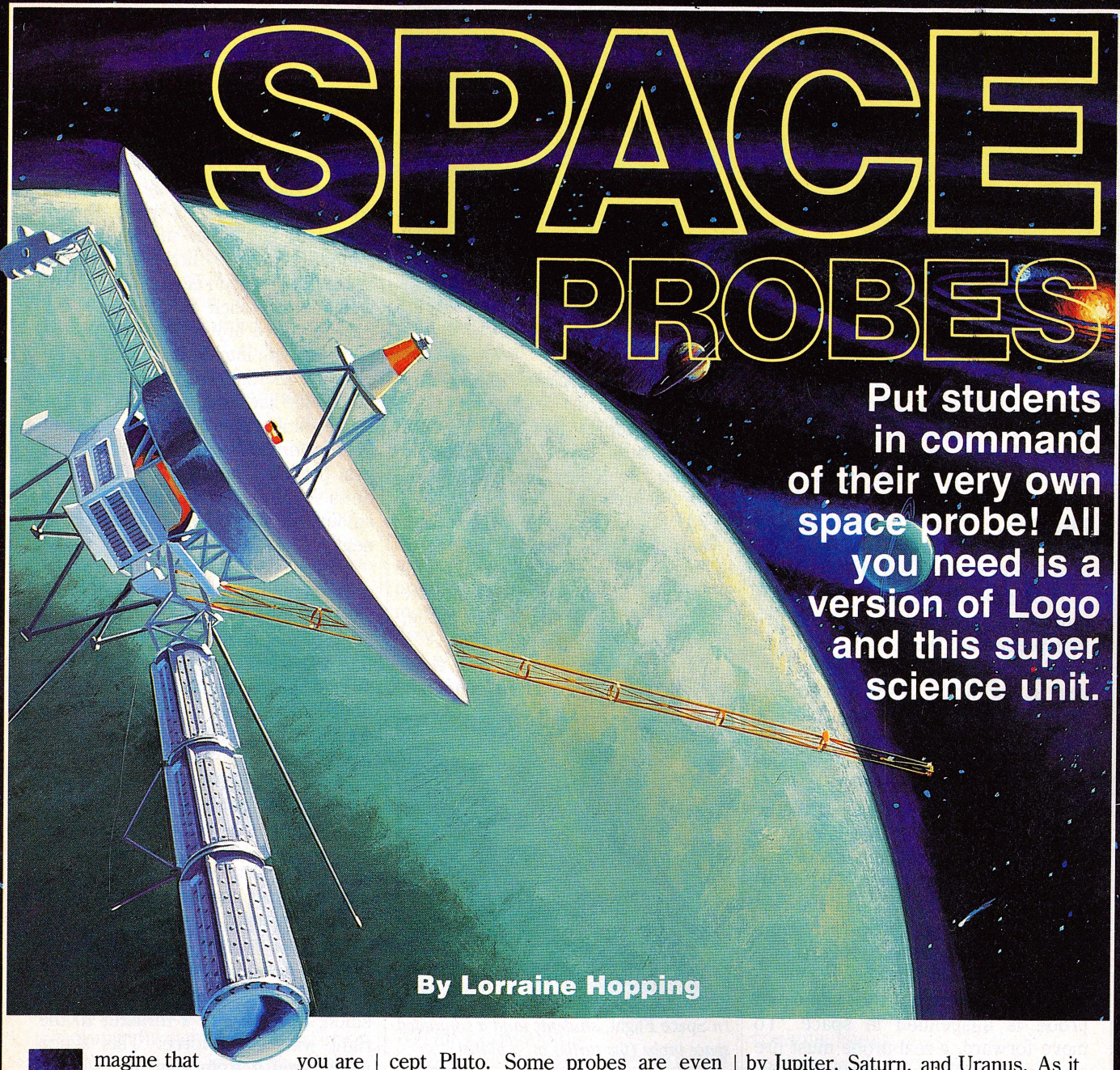


By Lorraine Hopping

Imagine that you are in a place with no air to breathe, no food, and no water. Temperatures range from hundreds of degrees below zero to thousands of degrees above zero. A stream of gas particles, traveling at a million miles per hour, bombarbs you continuously.

This hostile place is, of course, outer space. As you can imagine, protecting a human being in space is very difficult. And, for a flight to a distant planet, it is impractical.

That's why scientists send robotic space probes, instead of humans, to explore other planets. Space probes have flown by or will soon fly by every planet in the solar system except Pluto. Some probes are even heading beyond the planets into interstellar space. (See chart on page 24.)

With each mission, space probes uncover many new facts about our universe. With the help of the Logo programming language and this teaching unit, you can pass on much of this information to students.

In the first activity of the unit, students run a Logo program that simulates the flight of a probe in space. By making the simulated probe turn, move forward, change direction, and stop, students learn how motion in space differs from motion on Earth.

In the second activity, students observe a Logo simulation of a space probe mission. Like the recent Voyager 2 probe, the Logo probe passes by Jupiter, Saturn, and Uranus. As it encounters each planet, it displays data about the planet on the bottom of the screen. Students record the data and make observations about the simulated journey.

The final activity challenges students to extend the Logo probe mission to Neptune. This is the only activity that requires knowledge of Logo programming. (To complete the activity, students must be familiar with the FD, BK, LT, RT, REPEAT, and CS or DRAW commands, and should be able to define and edit procedures.)

The *Space Flight* and *Space Probe Mission* programs in this unit were written for Apple, Commodore, Krell, and Terrapin versions of Logo.

(continued)

Joel Naprstek

ACTIVITY 1: COMMAND A SPACE PROBE

OBJECTIVE: In a simulation program called *Space Flight*, students maneuver a space probe (the Logo turtle) through "space." They learn how motion in space differs from motion on Earth.

PREPARATION: You will need a large rubber ball. (Any size smaller than a basketball will do.)

Type in and save the *Space Flight* program listing on page 21. Just before presenting the lesson, load and start the program. The turtle will appear in the middle of the screen. Directions for moving and controlling it will appear on the bottom of the screen. Position the computer monitor so that everyone can see it.

ACTIVITY: Tell students that the *Space Flight* program that is now on the computer screen *simulates* how probes fly through space. (To simulate something means to imitate or copy it.) The Logo turtle represents a space probe and the screen represents outer space.

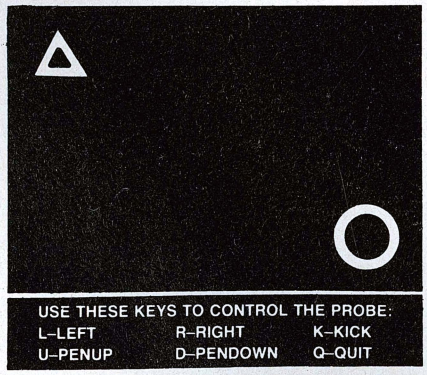
At the moment, the simulated probe is suspended in space. To move forward, a real probe must fire small rockets that are attached to it. These small rockets are called *thrusters*. Their name comes from the word *thrust*, which means forward movement.

When fired, thrusters cause the probe to move forward by releasing a strong jet of gas in the *opposite* direction in which the probe will travel. This is based on Sir Isaac Newton's third law of motion, which states that for every action there is an equal and opposite reaction.

To help kids understand this principle, tell them to imagine that they are wearing roller skates and that they are facing a wall. What would happen if they "pushed" forward on the wall? *(They would start to move backward, which was the opposite direction in which they pushed.)*

Show students that they can fire the simulated probe's thrusters by pressing the K key once. This will cause the probe to move forward at a steady speed, and in a straight line. (When the turtle reaches the top of the screen, it will "wrap around" and reappear on the bottom of the screen.) To speed up the probe, press the K key a second time.

While the probe is moving along the screen, gently roll a ball along the floor of the classroom. (Make sure there is nothing in its path.) The ball will eventually come to a stop. Does anyone know why? Explain that the ball stops because of a force called *friction*. Friction is resistance caused by two bodies (objects) that rub together.



In Space Flight, *students land a simulated space probe (the turtle) on a planet.*

In the case of the moving ball, one of the ways friction was caused was by the ball rubbing against the floor. Another less obvious cause of the friction was air. Air in the earth's atmosphere "resists" objects that pass through it. Air resistance is called *drag*.

Direct childrens' attention back to the computer screen. Point out that the probe is still moving forward. Can anyone guess why it has not slowed down or stopped? Explain that a probe (or any other moving object) encounters very little friction in space. One reason is that objects are weightless, which means they can float or move around without necessarily coming into contact with another body. Another reason is that there is no air like that surrounding the Earth's atmosphere to cause friction. (The *solar wind*, a steady stream of gas particles emitted by the sun, does cause an extremely small amount of friction, but its effect is negligible.)

Explain that the simulated probe is now demonstrating Newton's first law of motion, which states that a body in motion tends to stay in motion and a body at rest tends to stay at rest unless it encounters an additional force. This physical property applies to all objects and is called *inertia*.

Show students that they can rotate the probe 15 degrees to the right by pressing the R key. Explain that for a real probe to do this, it would take two steps. First, it would fire a thruster to its left in order to spin to the right. (Remind students of Newton's third law of motion and the roller skate example.) Then, as soon as the probe reached the correct position, it would fire a thruster to the right with equal force. This action would stop it from spinning. (Again, Newton's third law of motion is at work.)

Ask students what would happen if the probe only did the first step. *(According to Newton's first law of motion, the space probe would continue spinning to the right at a constant speed and for an indefinite length of time.)*

Explain that in the simulation program, the R and L (left) key commands do both steps automatically so that the probe is easier to control. Press the L key to point the probe forward again.

Ask if anyone can suggest a way to stop the probe from moving forward. Stop the program (press the Q key)

and tell kids to write down their ideas on paper. Now let students test their ideas by running the program on their own. First type SPACE.FLIGHT and press RETURN. Then tell children to put the probe in motion and test their ideas for stopping it. If students understand Newton's third law of motion, they will stop the probe by pointing it in the *opposite* direction that it was moving and firing the thrusters the same number of times that they did to start the probe moving forward.

Tell students to start the probe in motion again and practice maneuvering it around the screen.

When they understand how the probe moves on the screen, tell them to press Q for quit, type TARGET, and press RETURN. A planet will appear in the bottom right corner of the screen. Challenge kids to make the space probe come to a complete stop in the middle of the planet. As a hint, tell them to use the D (pendown) command to more clearly see the exact direction that the probe is heading. To pick up the pen again, they can press the U key.

By completing this activity, students will demonstrate that they understand Newton's first and third laws of motion. They will also demonstrate their ability to solve a problem by planning a strategy and carrying it through. (Stopping the probe on the planet through trial and error or random commands is extremely difficult. If students start out with this method and don't succeed, suggest that they stop the program and start it over again.)

To see a sample solution to the activity, type TARGET, press RETURN, and follow these steps:

1. Press the R key eight times.
2. Press the K key once.
3. While the probe is moving toward the target, press the L key 12 times.
4. As soon as the probe is inside the planet, press the K key once. The probe will come to a complete stop.

Other solutions to this exercise are possible. Encourage students to compare strategies for "landing" on the planet.

PROGRAM LISTING FOR SPACE FLIGHT

This program simulates the movement of a space probe in outer space. Students can control the probe (represented by the Logo turtle) by pressing these keys:

L = rotate left
R = rotate right
K = kick (forward thrust)
D = pendown
U = penup
Q = quit program

To enter the program into your computer, first load the Logo language disk. When the question mark prompt appears on the screen, remove the language disk from the disk drive and insert a blank, initialized disk. Type the procedures for your Logo version exactly as they appear. Save the program under an appropriate file name, such as PROBE.

To run the program without a target planet on the screen, type SPACE .FLIGHT and press RETURN. To run the program with a target planet, type TARGET and press RETURN.

Apple Logo Version:

```
TO SPACE.FLIGHT
  CS MAKE "VX 0 MAKE "VY 0 WRAP
  PRINT.COMMANDS COAST
END

TO PRINT.COMMANDS
  PRINT [USE THESE KEYS TO CON
TROL THE PROBE:]
  PRINT [L - LEFT R  - RIGHT K - KICK]
  PRINT [U - PENUP  D - PENDOWN  Q -
QUIT]
END

TO COAST
  MOVE.PROBE COMMAND COAST
END

TO MOVE.PROBE
  SETPOS SE (XCOR+:VX) (YCOR+:VY)
END

TO COMMAND
  IF KEYP [MAKE "COM RC] [STOP]
  IF :COM = "R [RT 15]
  IF :COM = "L [LT 15]
  IF :COM = "K [KICK]
  IF :COM = "U [PU]
  IF :COM = "D [PD]
  IF :COM = "Q [THROW "TOPLEVEL]
END
TO KICK
  MAKE "VX :VX + SIN HEADING
  MAKE "VY :VY + COS HEADING
END

TO TARGET
  MAKE "VX 0 MAKE "VY 0 CS PU
  SETX 100 SETY -50 PD PLANET 2
  PU SETX -110 SETY 70
  WRAP PRINT.COMMANDS COAST
END

TO PLANET :SIZE
  REPEAT 36 [RT 10 FD :SIZE]
END
```

Commodore, Krell, and Terrapin Logo Version:

Type in the PRINT.COMMANDS, COAST, KICK, and PLANET procedures listed for the Apple Logo version. Then enter the following procedures exactly as they appear.

```
TO SPACE.FLIGHT
  DRAW MAKE "VX 0 MAKE "VY 0 WRAP
  PRINT.COMMANDS COAST
END

TO MOVE.PROBE
  SETXY (XCOR+:VX) (YCOR+:VY)
END

TO COMMAND
  IF RC? MAKE "COM RC ELSE STOP
  IF :COM = "R RT 15
  IF :COM = "L LT 15
  IF :COM = "K KICK
  IF :COM = "U PU
  IF :COM = "D PD
  IF :COM = "Q TOPLEVEL
END

TO TARGET
  MAKE "VX 0 MAKE "VY 0 DRAW PU
  SETX 100 SETY -50 PD PLANET 2
  PU SETX -110 SETY 70
  WRAP PRINT.COMMANDS COAST
END
```

(continued)

ACTIVITY 2: OBSERVE A SPACE PROBE MISSION

OBJECTIVE: Students observe a simulation of a space probe mission, which is modeled after the recent Voyager 2 mission. They record and interpret data that the simulated probe provides. This data is similar to data Voyager 2 has provided.

PREPARATION: Make copies of the "Planet Data Chart" worksheet on the back of this month's poster (page 25). Hang up the poster.

Type in and save the *Space Probe Mission* program listing on page 23.

ACTIVITY: Discuss this month's poster with the class. The poster provides information on the Voyager 2 space probe.

Tell students that they are about to watch a simulation (re-creation) of Voyager's mission on the computer. Their job is to write down any information that Voyager sends back to Earth.

Divide the class into teams of two or three and pass out one copy per team of the "Planet Data Chart" worksheet.

Load the *Space Mission* program. Explain to students that when they run the program, they will see the space probe (the turtle) lift off from Earth. Like Voyager, the Logo space probe will fly by Jupiter, Saturn, and Uranus. Each time the probe passes a planet, it will display data about the planet on the bottom of the screen. Students will have a few seconds to record the data on their worksheet. Suggest to students that they also pay close attention to what happens on the screen. Later they will be asked what action they observed on the screen as well as what data they recorded.

Have each student team run the program. (Type MISSION and press RETURN.) The program takes about five minutes to run. (To speed it up, increase the number after WAIT in the FLY procedure. To slow the program down, decrease that number.)

After everyone has finished running the program, discuss the data they have collected on their worksheets. (See page 60 for answers to the worksheet. Also, note that the section on Neptune remains blank. Students will fill this out when they do the final activity in this unit.) Here are some sample discussion questions:

- Did the probe land on any of the planets? *(No.)* Did it orbit the planets? *(No. It just flew by them. You might want to point out that each of Voyager's "flybys" lasted only a couple of hours.)*

- Which of the three planets in this mission is the biggest? *(Jupiter.)* The smallest? *(Uranus.)* If the earth's diameter is about 8000 miles, how many times bigger than Earth is Jupiter? *(11 times.)* How many times bigger is Uranus? *(4 times.)*

- Which planet has the coldest temperature? *(Uranus, -357° F.)* Why? *(It is farthest from the sun.)* What is the temperature of Jupiter's atmosphere? *(-236° F.)* Its surface? *(34,000°F.)* Does anyone know why the surface of Jupiter is so much hotter than its clouds? *(The planet gives off a lot of its own heat and its extremely dense clouds trap the heat on the planet's surface.)*

- Which planets have visible rings? *(Saturn and Uranus. Some students might also know that Jupiter has an extremely thin ring of gases around it.)* What are these rings made of? *(Saturn's rings are made of small ice particles. Uranus's rings are made of boulder-size chunks.)*

- What chemicals are found in all three of the planets' atmospheres? *(Hydrogen, helium, and methane.)*

- If the probe left Earth on August 20, 1977, how long did it take to reach Jupiter? *(One year, 10 months, and 19 days; or 688 days.)* If the probe traveled an average of 960,000 miles per day, how far did it travel to reach Jupiter? *(960,000 x 688 = 660,480,000 miles.)*

- How many moons did children see around Jupiter? *(4.)* How many are there altogether? *(16.)* Are the four largest moons all about the same size? *(No. Two are slightly larger.)*

- How long did it take the probe to reach Saturn from Jupiter? *(Two years and 42 days, or 773 days.)* Tell students that after leaving Jupiter, the real probe was traveling faster than it was when it left Earth. If the scientists on Earth did not increase the probe's speed, what did? *(Jupiter's gravity pulled the probe toward the planet, increasing its speed. As the probe passed by the planet, the gravity flung it into space like a giant slingshot.)*

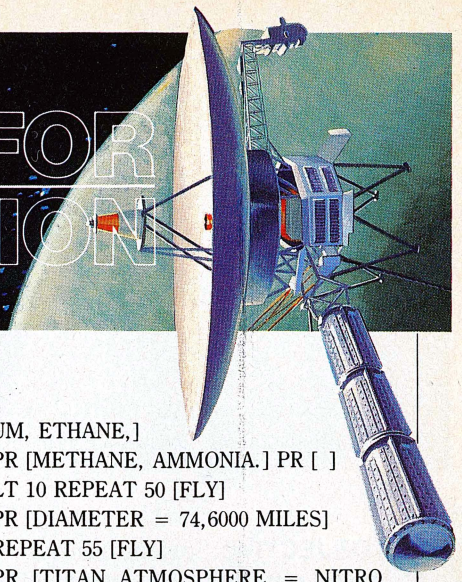
- How many moons does Saturn have altogether? *(23.)* What is the name of Saturn's biggest moon? *(Titan.)* What chemical did the probe detect in Titan's atmosphere? *(Nitrogen.)* Was this chemical detected in the atmosphere of the planets? *(No.)*

- How long did it take the probe to reach Uranus from Saturn? *(4 years, 5 months, and 4 days; or 1617 days. Point out that the journey from Saturn to Uranus took almost as long as the journeys from Earth to Jupiter and Jupiter to Saturn combined.)*

- How many moons does Uranus have? *(15.)* Point out that Voyager 2 found nine of these moons. Why didn't we know about the moons before? *(They are too small and too far away to be seen from telescopes on Earth.)*

- What else did children observe during the mission? *(Answers will vary.)*

PROGRAM LISTING FOR SPACE PROBE MISSION



This program simulates the journey of a space probe through the solar system. Use it with the "Observe a Space Probe Mission" activity on page 22 and the "Design a Mission to Neptune" activity on page 24.

To enter the program into your computer, first load the Logo language disk. (The program will work for Apple, Commodore, Krell, and Terrapin versions of Logo.) Then enter the procedures for your Logo version exactly as they appear. Save the program under an appropriate file name, such as MISSION. To run the program, type MISSION and press RETURN.

Apple Logo Version:

```
TO MISSION
  CS CLEARTEXT PU HT LAUNCH
  JUPITER LEG2 SATURN LEG3 URANUS
LEG4
END

TO LAUNCH
  SOLAR.SYSTEM PU SETX 130 SETY 0
  SETH 0 ST COUNTDOWN 10
  REPEAT 10 [FLY] LT 70
  REPEAT 90 [FLY]
  PR [PREPARE FOR A CLOSEUP OF JU-
PITER....]
END

TO COUNTDOWN :NUMBER
  PRINT :NUMBER
  IF :NUMBER = 1 [PR [LIFT OFF!]
STOP]
  WAIT 30 COUNTDOWN :NUMBER - 1
END

TO JUPITER
  CS HT SETX 0 SETY 120 SETH 0 PD
  PLANET 17 PU JMOONS
  SETX 120 SETY -80 SETH 300
  PR [DATE: JULY 9, 1979]
  REPEAT 10 [FLY]
  PR [4 BIG MOONS, 12 SMALL MOONS
SIGHTED.]
  REPEAT 30 [FLY]
  PR [DIAMETER = 88,700 MILES.]
  REPEAT 20 [FLY]
  PR [TEMPERATURE IN CLOUDS = -236
DEGREES]
  REPEAT 40 [FLY] PR [ ]
  PR [ATMOSPHERE = HYDROGEN, HE
LIUM, ETHANE,]
  PR [METHANE, AMMONIA]
  LT 30 REPEAT 60 [FLY] PR [ ]
  PR [TEMPERATURE NEAR SURFACE
=]
  PR [APPROXIMATELY 34,000 DE
GREES.]
  LT 30 REPEAT 75 [FLY]
  PR [IMAGES SHOW VOLCANOES
ERUPTING ON IO.]
  REPEAT 35 [FLY] CLEARTEXT
  PR [HEADING FOR SATURN....]
END

TO JMOONS
  SETX -100 SETY 10 PD PLANET .4 PU
  SETX -100 SETY -60 PD PLANET .4 PU
  SETX 110 SETY 90 PD PLANET .6 PU
  SETX 120 SETY 60 PD PLANET .6 PU
  HOME SETPC 4 SETSCRUNCH .4 PD
  PLANET 4 SETSCRUNCH .8 PU SETPC 1
END

TO LEG2
  CS SOLAR.SYSTEM PU SETX 30 SETY
50
  SETH 270 REPEAT 80 [FLY]
  PR [PREPARE FOR A CLOSEUP OF SAT
URN....]
END

TO SATURN
  CS HT SETX 0 SETY 100 SETH 0 PD
  PLANET 14 PU RINGS
  SETX -100 SETY 30 PD PLANET .5 PU
  SETX 130 SETY 80 SETH 300
  PR [DATE: AUGUST 21, 1981]
  REPEAT 10 [FLY]
  PR [RINGS ARE MADE OF ICE PARTI
CLES.]
  LT 15 REPEAT 20 [FLY]
  PR [23 MOONS SIGHTED.]
  LT 15 REPEAT 40 [FLY]
  PR [TEMPERATURE IN CLOUDS = -285
DEGREES.]
  LT 10 REPEAT 60 [FLY]
  PR [ATMOSPHERE = HYDROGEN, HE
LIUM, ETHANE,]
  PR [METHANE, AMMONIA.] PR [ ]
  LT 10 REPEAT 50 [FLY]
  PR [DIAMETER = 74,6000 MILES]
  REPEAT 55 [FLY]
  PR [TITAN ATMOSPHERE = NITRO
GEN]
  REPEAT 40 [FLY] CLEARTEXT
  PR [HEADING FOR URANUS....]
END
TO RINGS
  SETX -130 SETY -80 SETH 55 SETPC 2
  PD FD 320 PU
  SETX -120 SETY -70 SETH 55 SETPC 3
  PD FD 290 PU
  SETX -110 SETY -60 SETH 55 SETPC 4
  PD FD 260 PU
  SETX -100 SETY -50 SETH 55 SETPC 5
  PD FD 230 PU
  SETX -90 SETY -40 SETH 55 SETPC 2
  PD FD 200 PU SETPC 1
END
TO LEG3
  CS SOLAR.SYSTEM PU SETX -90 SETY
10
  SETH 190 REPEAT 50 [FLY]
  PR [PREPARE FOR A CLOSEUP OF
URANUS....]
END
TO URANUS
  CS HT SETX 0 SETY 100 SETH 0 PD
  PLANET 15 PU SETX 5 SETY -80 SETH 0
  PD FD 200 PU SETX 130 SETY 120 SETH
180
  PR [DATE: JANUARY 24, 1986]
  REPEAT 10 [FLY]
  PR [15 MOONS SIGHTED.]
  RT 20 REPEAT 20 [FLY]
  PR [DIAMETER = 32,000 MILES]
  RT 20 REPEAT 40 [FLY] PR [ ]
  PR [TEMPERATURE IN CLOUDS = -357
DEGREES.]
  REPEAT 50 [FLY]
  PR [ATMOSPHERE = HYDROGEN,
HELIUM, METHANE]
  RT 10 REPEAT 50 [FLY]
  PR [NINE THIN RINGS CONTAIN
LARGE BOULDERS.]
  REPEAT 70 [FLY] CLEARTEXT
  PR [HEADING FOR NEPTUNE....]
END
```

(continued on page 59)

ACTIVITY 3: DESIGN A MISSION TO NEPTUNE

OBJECTIVE: Students plan a space probe mission to Neptune and then program the Logo turtle to simulate the mission on the computer.

PREPARATION: Complete Activity 2, "Observe a Space Probe Mission," before beginning this activity. Student teams will need the "Planet Data Chart" worksheet, which they began in Activity 2. Each team will also need a printout of the *Space Mission* program listing from page 23.

ACTIVITY: Tell students to complete their "Planet Data Chart" worksheet by filling in the information under Neptune. Most of the information can be found in an encyclopedia or almanac. (See page 60 for answers.)

Now have children use this worksheet data and their Logo programming skills to extend the *Space Mission* program to include the planet Neptune. They will need to extend the LEG4 procedure so that it shows the turtle traveling from Uranus to Neptune. Then they will need a NEPTUNE procedure that shows a closeup of the planet and the data from the worksheet. (Don't forget to add the procedure name NEPTUNE to the end of the MISSION procedure.)

After students have added their NEPTUNE procedure to the program, tell them to run the entire program to make sure it works. They should then save the program under a unique file name.

Here is one solution to the exercise. (It will work for Apple Logo only.)

```
TO MISSION
  DRAW CLEARTEXT PU HT LAUNCH
  JUPITER LEG2 SATURN LEG3 URANUS
  LEG4 NEPTUNE
END

TO LEG4
  CS SOLAR.SYSTEM PU SETX -110 SETY
-50
  SETH 200 REPEAT 50 [FLY] CS SETX
100
  SETY -50 SETH 0 PD HT PLANET 2 PU
  SETX 120 SETY -50 SETH 270 REPEAT
20 [FLY]
  PR [PREPARE FOR A CLOSEUP OF
NEPTUNE....]
END

TO NEPTUNE
  CS HT PU SETY 120 PD PLANET 15 PU
  SETX 100 SETY 100 SETH 270
  REPEAT 30 [FLY]
  PRINT [DIAMETER = 31,000 MILES]
  REPEAT 30 [FLY]
  PRINT [DETECTING SOME EVIDENCE
OF RINGS.]
  LT 30 REPEAT 40 [FLY]
  PRINT [TEMPERATURE = -360 DE
GREES]
  LT 15 REPEAT 50 [FLY]
  PRINT [THREE MOONS SIGHTED.]
  REPEAT 80 [FLY]
  PRINT [HEADING OUT OF SOLAR SYS
TEM....]
  REPEAT 50 [FLY]
END
```

EXTENSION: Challenge more advanced Logo programmers to design their own space probe mission to any planet in our solar system. Have them name their probe, and outline its flight plans and the purpose of its mission before writing their programs.

INFORMATION ON SELECTED SPACE PROBES: 1975-1990

The first space probes were launched in the 1950s. Since then, dozens of American, Soviet, and European probes have gone on exploratory missions in space.

This chart provides information on a few of the U.S. probes. Information on future probe missions is accurate as of March, 1986, but could change due to unforseen circumstances.

Probe	Launch Date	Destination(s) (Arrival Date)	Status
Viking I Lander	8/20/75	Mars (7/20/76)	Lost power 1983; stranded on Mars
Viking II Lander	9/9/75	Mars (9/3/76)	Lost power in 1980; stranded on Mars
Mariner 10	11/3/73	Venus (2/5/74), Mercury (3/29/74, 9/21/74, 3/16/75)	Deactivated in 1975
Pioneer Venus	5/20/78	Venus (12/4/78)	Orbiting Venus; sent data on Comet Halley in 1985-86
Pioneer 10	3/2/72	Jupiter (12/3/73), crossed orbits of Saturn (4/20/76), Uranus (7/11/79), Pluto (4/25/83), and Neptune (6/13/83)	Heading out of solar system
Pioneer 11	4/9/73	Jupiter (12/2/74), Saturn (9/1/79)	Heading toward Neptune; will help Voyager II monitor planet in 1989
Voyager 1	9/5/77	Jupiter (3/5/79), Saturn (11/12/80)	Heading out of solar system
Voyager 2	8/20/77	Jupiter (7/9/79), Saturn (8/21/81), Uranus (1/24/86)	Heading for Neptune; flyby 8/24/89
Ulysses	Undetermined	Jupiter, the sun, beyond solar system	Mission postponed due to shuttle accident
Galileo	Undetermined	Jupiter (8/88*), asteroid Amphitrite	Mission postponed due to shuttle accident
Venus Radar Mapper	4/88*	Venus (7/89*)	Funded, but not built; exact launch dates to be announced
Mars Observer	8/90*	Mars (8/91*)	Funded, but not built; exact launch dates to be announced

*Date uncertain.

MICRO TIMES™

The mini-magazine for kids who love computers.

Published by Scholastic Inc. May/June 1986

Computers Fight Forest Fires

U.S. Forest Service

The first fire fighters on the scene radio for help (inset), and the fire is quickly put out before it spreads.

Remember the last time you saw a summer storm? Thunder boomed. Lightning flashed. Wild winds swept across the earth.

You probably watched the storm from the safety of your home. But trees, standing tall and straight in the open air, were not so safe. Their great size made them easy targets for lightning bolts.

A single storm produces hundreds of lightning bolts. When these powerful electric

(Continued on next page.)

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Computers Fight Forest Fires..1,2
Joke Contest Winners 2
Fortune Teller Program 3
Crossword Puzzle..... 4

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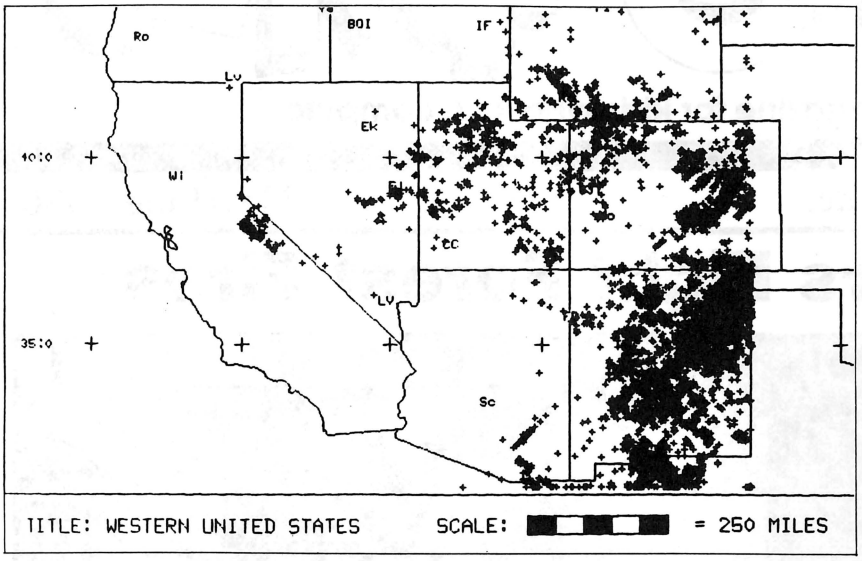
Written by Lorraine Hopping.

Computers Fight Forest Fires

Map courtesy of Boise Interagency Fire Center



This computer-made map shows where lightning struck during a storm.

(Continued from page 1.)

charges strike a tree, they often set it on fire. Strong winds can quickly spread the flames and form a blazing forest fire.

Lightning causes 70 to 90 percent of all forest fires in the United States and Canada. Forest rangers can't prevent lightning from setting trees on fire. But they *can* prevent the fires from spreading out of control.

The trick is to spot a "lightning strike" as soon as it hits. That way, fire fighters can rush to the site and put out the flames before they grow too big.

To pinpoint a "lightning strike" forest rangers in the western United States rely on a computer system called the Initial Attack Management System (IAMS).

The IAMS consists of a minicomputer and more than two dozen antennas. The antennas are spread out in forests all across the West. They can detect lightning that has struck up to 250 miles away. Less than a second later, they can tell the central computer exactly where lightning struck and how strong the bolt was.

The computer displays a map of the area. The "hot spot" detected by the antennas shows up on the map as a cross. Officials send a plane or helicopter to the spot right away. If the pilot sees fire on the ground, he or she tells the officials to bring on the fire fighters—*pronto*!

Review Questions

1. What is the major cause of forest fires in the United States and Canada?
2. Why are trees easy targets for lightning bolts?
3. Can forest rangers prevent fires caused by lightning from starting?
4. How can they prevent fires from spreading? What role do computers play?

JOKE CONTEST WINNERS

Congratulations to Christine Laurie of The Bronx, NY, and to Kes Kasha of Eckville, Alberta (Canada)! They tied for first place in our Computer Joke Contest! They will each receive $10 for these winning jokes:

Q: What did the computer say to the race car driver?
A: Ready, cassette, go!

Christine Laurie

Q: What did the computer say to the lady?
A: Hello, modem.

Kes Kasha

✸ ✸ ✸ ✸ ✸ ✸ ✸ ✸

A few other entries came very close to winning. Here are the "just miss" jokes and the names of the runners-up:

Q: What did the computer say to the knock-knock joke?
A: Enter.

Kara Franco
Port Jefferson Station, NY

Q: Why did the monster buy a computer?
A: Because he thought it was user-fiendly.

Paul Bonvallet
Westerville, OH

Q: What did the computer say when it landed on Mars by accident?
A: I didn't planet this way.

Max Follweiler
Reading, PA

Program Listing

Electronic Fortune Teller

Summer is almost here. Do you know what's in store for you? Consult our *Electronic Fortune Teller* program to find out!

WHAT TO DO

1. Put your computer in BASIC.
2. Type in the *Electronic Fortune Teller* program listing. (If you are using an Atari computer, Color Computer, or TRS-80 Model III, make the changes listed at the end of the program.)
3. Type RUN and press RETURN or ENTER.

ELECTRONIC FORTUNE TELLER PROGRAM LISTING

```
10 PRINT "  ***********************************"
20 PRINT "  *          MADAME BEEP'S          *"
30 PRINT "  *    CRYSTAL BALL COMPUTER        *"
40 PRINT "  ***********************************"
50 PRINT:PRINT "PRESS RETURN TO SEE YOUR FORTUNE."
60 INPUT Z$
70 PRINT:PRINT " I'M GAZING INTO MY CRYSTAL BALL...."
80 FOR D=1 TO 4000:NEXT D
90 PRINT:PRINT " I SEE..."
100 FOR D=1 TO 4000:NEXT D
110 PRINT
120 P=INT(3*RND(1))+1
130 ON P GOSUB 160,230,290
140 PRINT:PRINT " PLEASE COME AGAIN SOON...."
150 END
160 PRINT "...A ROOM!... IT'S A BEDROOM.... IT'S A"
170 PRINT "VERY MESSY BEDROOM.... SOMEONE"
180 PRINT "ING THE ROOM.... I SEE THAT IT'S..."
190 FOR D=1 TO 10000:NEXT D
200 PRINT "YOU! YOU WILL SPEND THE SUMMER"
210 PRINT "CLEANING YOUR ROOM!"
220 RETURN
230 PRINT " ...A BASEBALL FIELD! YOU ARE AT BAT."
240 PRINT "THE BALL IS PITCHED.... IT'S A..."
250 FOR D=1 TO 6000:NEXT D
260 PRINT:PRINT " ...HOME RUN! I PREDICT THAT YOU WILL"
270 PRINT "HIT A HOME RUN THIS SUMMER."
280 RETURN
290 PRINT " ...A BIG STAGE!... IT'S A CONCERT. I"
300 PRINT "CAN'T MAKE OUT THE STAR.... WAIT!..."
310 PRINT " ...IT'S.... IT'S..."
320 FOR D=1 TO 10000:NEXT D
330 PRINT "YOU! YOU'LL BE A BIG STAR THIS SUMMER!"
340 RETURN
```

Note: If you are using an Atari computer, add this line: 1 DIM Z$(1)

If you are using a Color Computer or a TRS-80 Model III/4 computer, change line 120 to 120 RANDOM:P=RND(3)

FORTUNE TELLER SUPERCHALLENGE

Make your own predictions for this summer, both good and bad. Then add them to the program. (**Hint:** Change the 3 in line 120 to the total number of predictions. Add a subroutine for each new prediction.)

MY SUMMER PREDICTIONS

Directions: Write your own predictions below. Add them to the program.

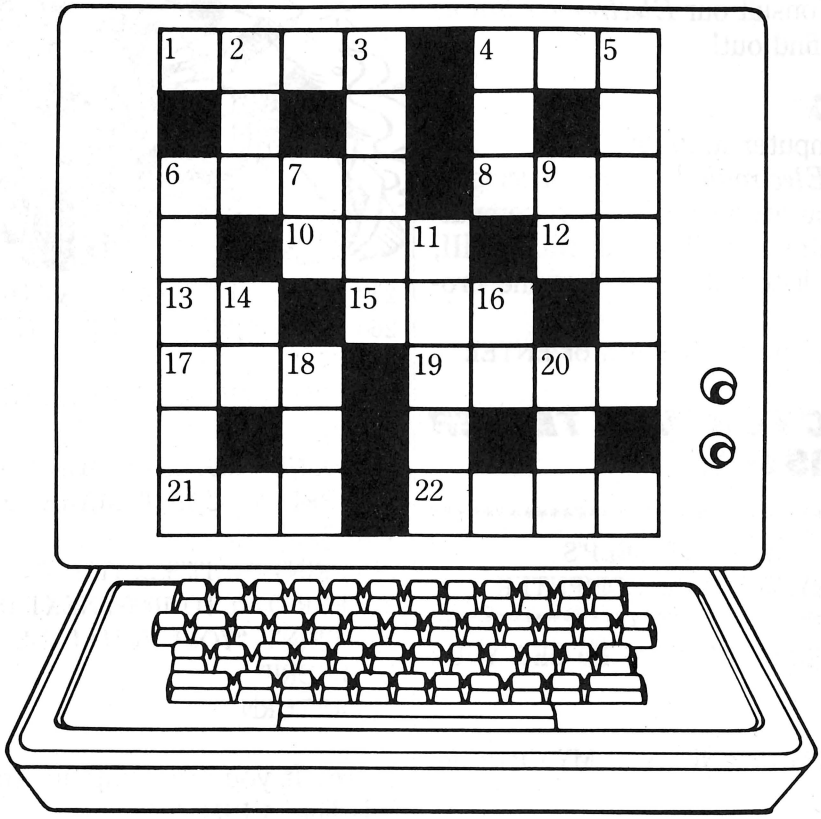
1. _____
2. _____
3. _____
4. _____
5. _____

Ron Zalme

A Mostly BASIC Crossword Puzzle

Directions: Read the puzzle clues below. Write the answer to each clue in the blank spaces provided. Clues that have a star next to them refer to commands or words used in BASIC programming.

Use the answers to fill in the puzzle.



Across Clues

*1. Fill in the missing command:
200 _____ 1,15,JANUARY,2,14, FEBRUARY

*4. Fill in the missing command:
10 _____ ASTRO KING PROGRAM

*6. _____ . . . DATA

*8. BASIC command that stands for "dimension."

*10. Usually the first line number of a program.

12. Alien space ship: U _____ _____

13. Do, re, mi, fa, so, la, _____ , do.

15. The name of the sun.

*17. Put the computer to good _____.

19. A lot.

21. Shake your head in agreement.

*22. Fill in the missing command:
120 FOR D = 1 TO 100: _____ D

Down Clues

2. You _____ the Sunshine of My Life. (Song.)

3. Mountains in South America.

*4. BASIC command that stands for "random."

*5. A 64K computer has 64 kilobytes of _____ .

*6. GOSUB. . . _____

7. In the house: _____ home.

*9. Fill in the missing command:
210 _____ A = 12 THEN 250

11. ". . .to boldly go where _____ _____ has gone before." (*Star Trek* opening, two words.)

14. Present tense of "was."

16. Short for Los Angeles.

*18. BASIC command to stop the computer from processing.

20. Veto; say "no."

Answer: Your teacher has the answer to this puzzle. It is on page 60 of his or her copy of *Teaching and Computers* magazine.

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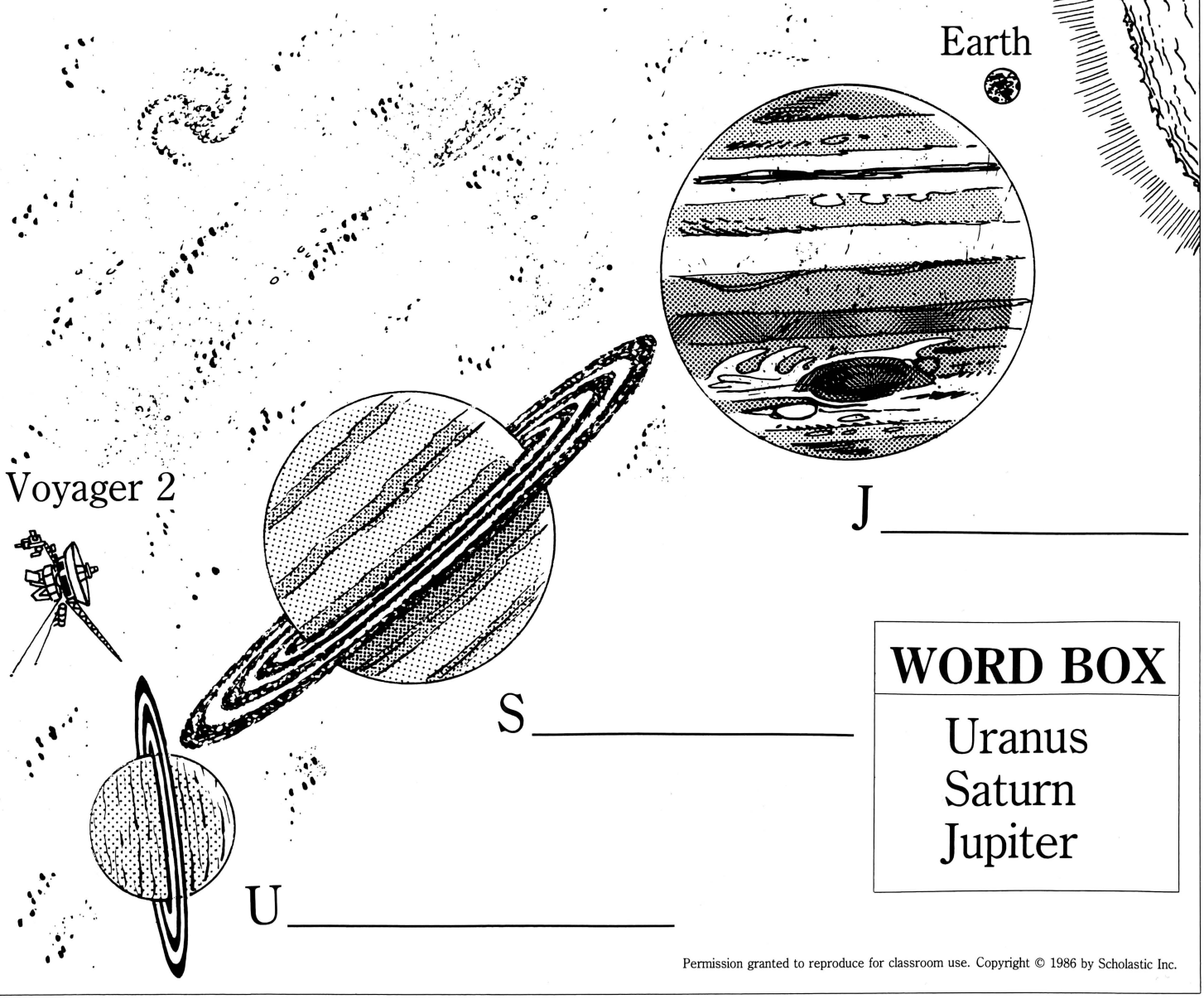
NAME THE PLANETS

Voyager 2 has flown by three planets. Can you name the three planets? Write the name of each planet next to its picture. Color the pictures.



WORD BOX

Uranus
Saturn
Jupiter

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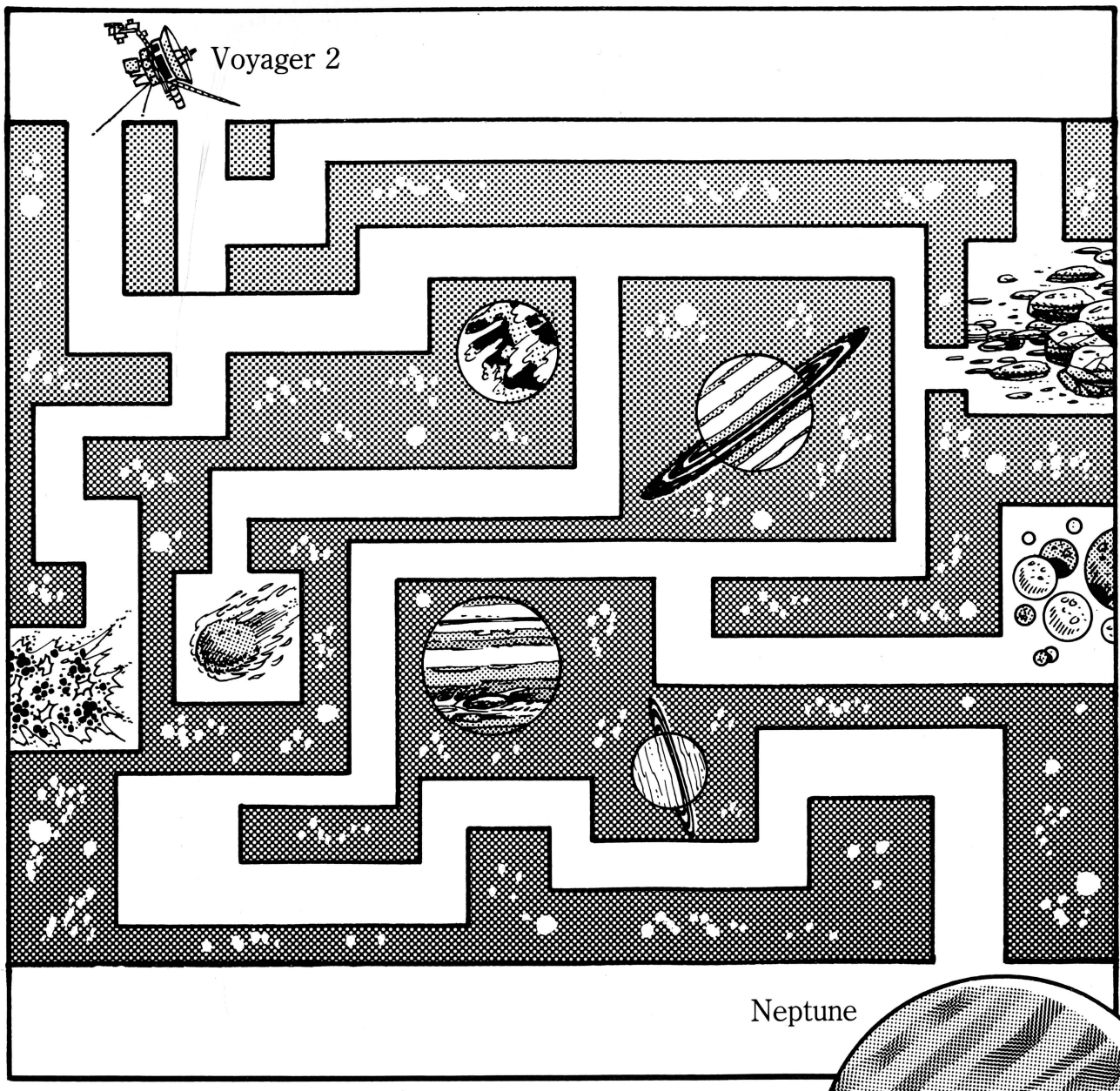
NAME: _____

FIND NEPTUNE

Voyager 2 has a long way to go to reach Neptune. Pretend you run the computers on Voyager 2. Help it get through this maze and reach Neptune.



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NAME: _____

Directions: Pretend you are a science news reporter. Complete the headline and write a newspaper story about a space probe and what it discovered. The probe can be real or make-believe. Don't forget to write a caption for the picture and put in your byline (your name!).

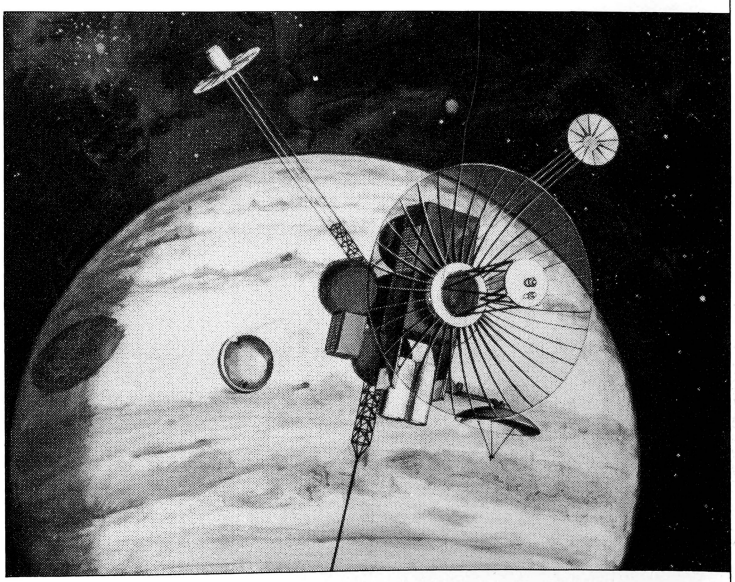
DAILY NEWSPAPER

July 12, 1989 **$1.00**

Space Probe Discovers _____

By _____
(your name)

PASADENA, CA–



Caption: _____

_____

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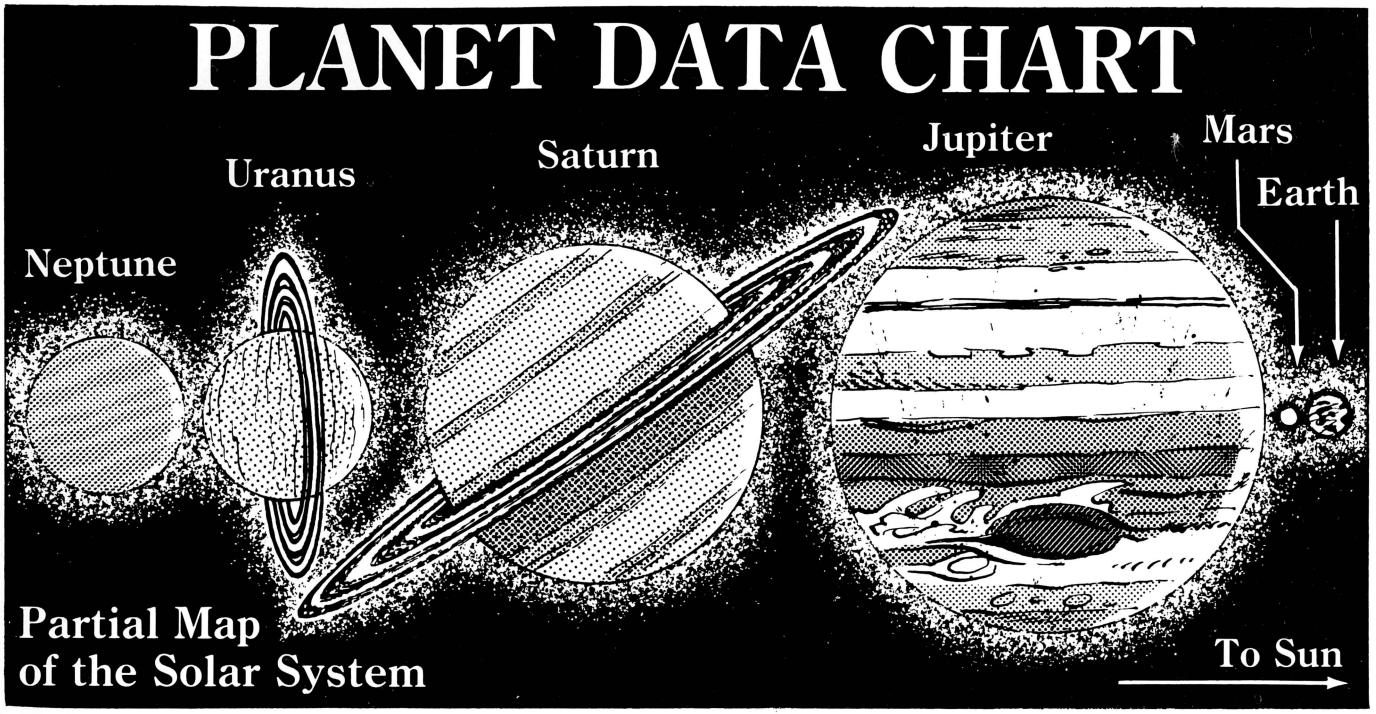
NAME: _____

PLANET DATA CHART



So far, Voyager II has flown by three planets: Jupiter, Saturn, and Uranus. It will fly by Neptune in 1989. To date, what do we know about these four planets? Use current references to fill in the data chart below.

JUPITER
Voyager's Arrival Date: _____
Diameter of Planet: _____
Temperature: _____
Atmosphere: _____
Number of Moons: _____
Other Observations: _____
_____

URANUS
Voyager's Arrival Date: _____
Diameter of Planet: _____
Temperature: _____
Atmosphere: _____
Number of Moons: _____
Other Observations: _____
_____

SATURN
Voyager's Arrival Date: _____
Diameter of Planet: _____
Temperature: _____
Atmosphere: _____
Number of Moons: _____
Other Observations: _____
_____

NEPTUNE
Voyager's Arrival Date: _____
Diameter of Planet: _____
Temperature: _____
Atmosphere: _____
Number of Moons: _____
Other Observations: _____
_____

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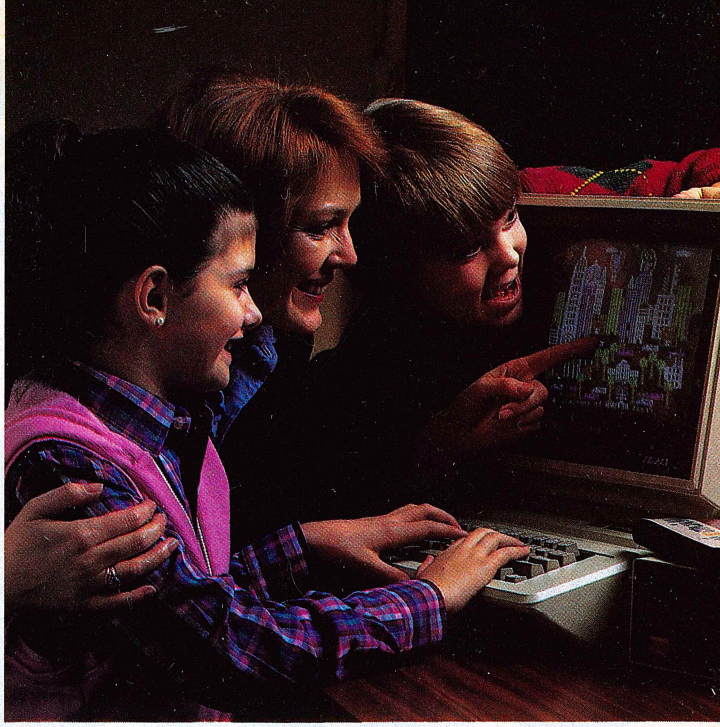

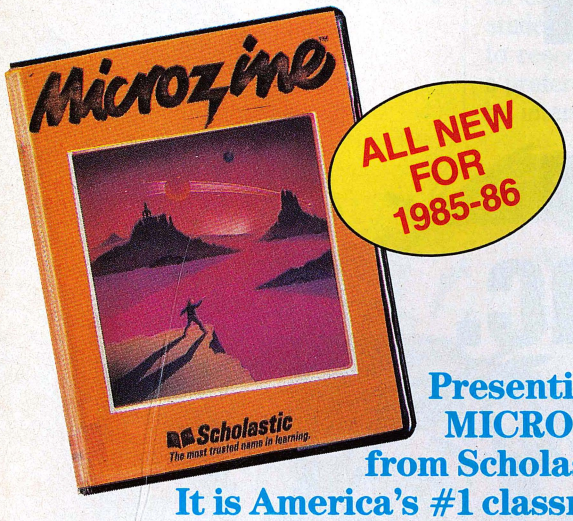

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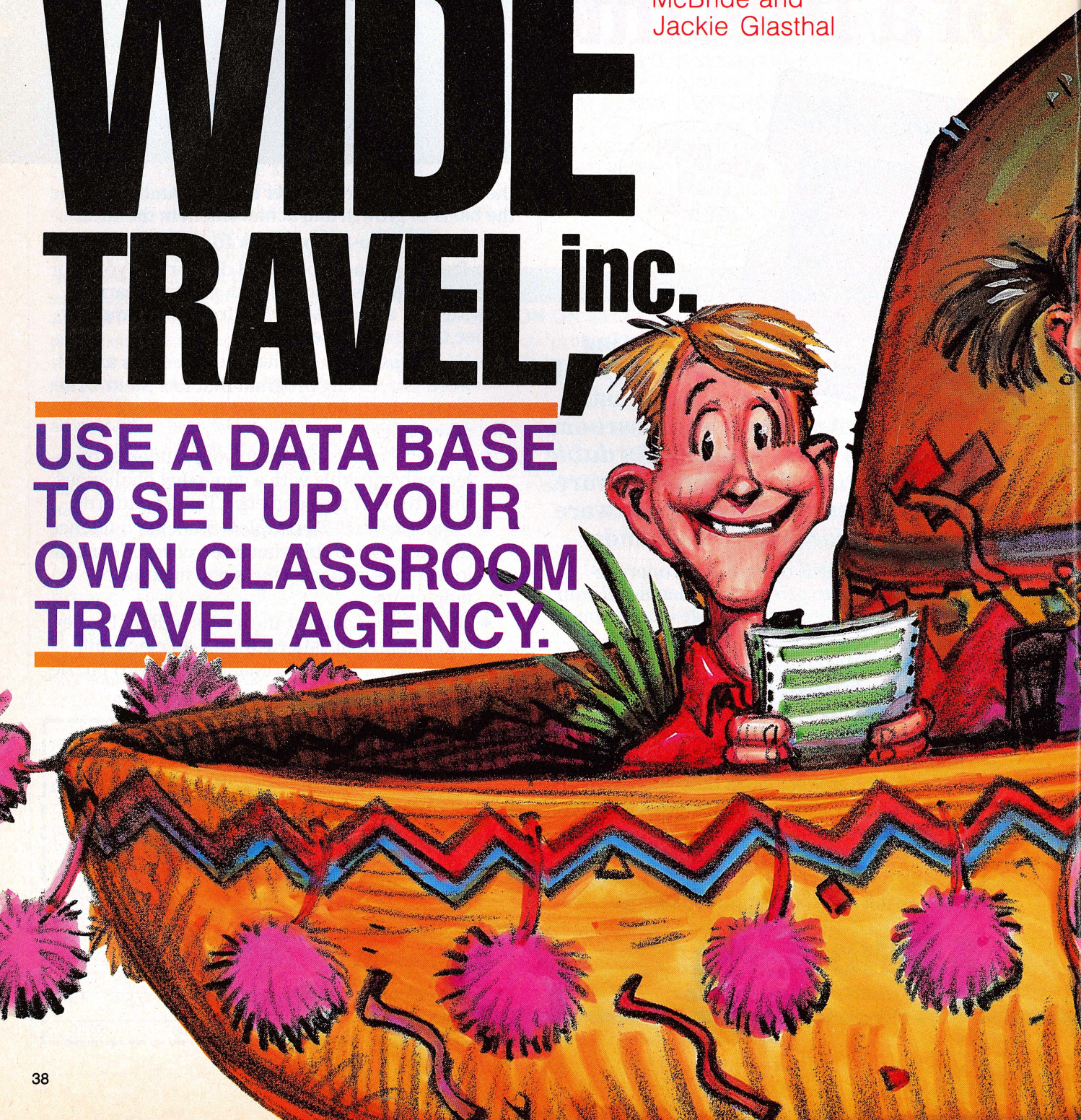


This teaching unit is your students' passport to geography knowledge — and fun! It shows how you and your students can use data base software to operate a computerized travel agency in your very own classroom. First, students set up a data file containing records on at least 20 travel-worthy countries. Once the data file is assembled, Worldwide Travel, Inc. is open for business! Students then access these files to help make-believe customers plan international trips. In the process of operating the travel agency, kids will learn about the climate, terrain, and sights associated with countries throughout the world.

The activities and procedures in the unit were designed for use with the *Scholastic PFS:file* data base program. They can be easily adapted, however, for use with any data base software. If you have never used data base software before, or if you are still unsure about how data bases work, read the box titled "Data Base Primer," page 41, for important introductory information.

SELECTING COUNTRIES TO RESEARCH

To set up a data file of countries for customers to visit, first have each student in your class select a country to research. Are there children with a preference? Certain students might be interested in researching a country from which their ancestors originated. Others may be planning to visit a certain country and have an interest in finding out more about it. Give children the opportunity to choose the country that they research, but have handy a list of suggestions for those who have no special preference. (Suggest countries that are popular with travelers.)

As students sign up for countries to research, be aware of the continents on which the countries are located. Europe may be the most popular, but try to get every continent represented by at least one country.

It is a good idea to have at least 20 different countries in your data file. If you have a class of less than 20 students, you may need to assign some students more than one country to research.

DESIGNING A DATA RECORD

Your students now know *where* they will be suggesting their customers travel. Next they need an idea of *what* those customers will see and do in these various countries. Explain to students that customers expect a lot of information from a travel agent.

(continued)

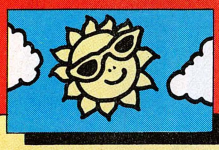
Bill Mayer

SAMPLE DATA RECORD

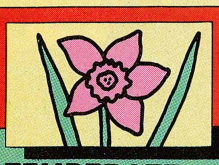
COUNTRY: Australia
CONTINENT: Australia
CAPITAL: Canberra
LANGUAGE: English
CURRENCY UNIT: Dollars
AREA: 2,966,150 square miles (7,682,300 square kilometers).
CLIMATE: Northern third of country hot and dry year 'round; the rest of country hot summers (Dec-Feb) and temperate or cold winters (June-Aug).
TERRAIN: Wide, rocky deserts and grasslands, except for areas along the coast (where the larger cities are located).
SIGHTS: Sidney (largest city), Great Barrier Reef (world's largest coral reef).
BEST KNOWN FOR: Koalas, kangaroos, and other unusual animal life.
OTHER: Located between the Indian and South Pacific Oceans. Most Australians are of British ancestry. Aborigines, a dark-skinned people, and the first Australians, now make up less than one percent of the population. Outdoor sports are extremely popular in Australia.

TEMPERATURE CHART

THE WEATHER TODAY IS. . .

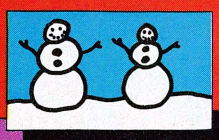


HOT — 77°F + / 25°C +



TEMPERATE (COMFORTABLE) — 59°F – 76°F / 15°C – 24°C

COLD — 32°F – 58°F / 0°C – 14°C



FREEZING — 31°F and below / minus 1°C and below

This chart shows how you can use temperature ranges to assign names to specific climates. In most cases, it is best to supply each country with a term for its winter weather and one for its summer weather.

Otherwise, they would just call an airline and make travel reservations for themselves. In addition to information about fares, hotels, and flight schedules, clients may ask for answers to questions such as: *What are the country's most famous landmarks? What is the weather like there? What kind of currency will I be using? What kinds of travel equipment might be useful to bring along?*

A data file can help answer these and other travel questions. To set it up, your classroom agents will need to develop a data record for each of the countries they research. Worksheet 1, page 42 , lists 11 fields to include on each record. The fields are: COUNTRY, CONTINENT, CAPITAL, LANGUAGE, CURRENCY UNIT, AREA, CLIMATE, TERRAIN, SIGHTS, BEST KNOWN FOR, and OTHER.

Distribute a copy of this worksheet to each student, and go over the fields as a group. Are there fields not listed on the worksheet that the class would like to include? If so, add them to the list.

Also, make a poster of the sample record on Australia (shown on this page). Have kids refer to the poster to get an idea of what kinds of information should be written in each field of a record.

DISCUSSING TERMS IN THE FILE

Just as the class must use the same fields for each data record, it must also use the same format for inserting information into these fields. For example, if one student inputs the area of China as 3,678,470 square *miles*, and another student inputs the area of Australia as 7,682,300 square *kilometers*, a math operation is needed to ascertain the larger of the two countries. If the units of measurement are reported in a consistent fashion, it is much easier to make a size comparison.

In addition to AREA, another field in which consistency could be a problem is CLIMATE. If one student refers to a country as "hot" and another uses the word "warm," how would a student know which country experiences higher temperatures? A more specific source would have to be consulted. To avoid this problem, you may want to make a chart like the one at left . The chart shows students what word to use, depending on a country's average temperature. (In most cases, students should use two words: one to describe the average summer temperature, and another to describe the average winter temperature.)

Explain to students that a data file is a computerized system — a way in which information can be arranged. It is a system, however, that may seem limiting at first. If a student learns something about a country that is of interest, but which does not fit into a specific data field, don't let the student discard the information as unimportant. First of all, encourage him or her to double check to see that the information cannot fit into any of the first 10 fields. (Fields such as SIGHTS and BEST KNOWN FOR are usually good catch-alls.) If this is not the case, have the child note the information in the last field on the worksheet, the OTHER field. Explain that, though the data does not fit into the file's more specific fields, it still is important information to have. The more information a travel agent has at his or her disposal, the better he or she is prepared to make suggestions to customers about where they should travel.

GATHERING DATA

Your students are now ready to do research on the country they have chosen. Take a trip to the library and tell children to use its reference materials to complete Worksheet 1. Much of the information your students will need to fill out the sheet can be found in an encyclopedia. Other good sources include books about specific countries, travel guides, and magazine articles.

REVIEWING THE INFORMATION

Have children use their completed worksheets to give short oral reports on their country. Students will get a better idea of what each continent looks like, and what countries it consists of, if all Asian countries are presented at one time, then all African countries, and so on. (*From largest to smallest, the continents are: Asia, Africa, North America, South America, Antarctica, Europe and Australia.)* Have each child point to his or her country on a map, tell what continent it is on, what its major sights are, and so on. At the end of each report, have each student review facts they inserted in the OTHER field.

As each student gives a report,

classmates should be listening for two things: inconsistencies in the agreed upon vocabulary words, and the information's content value. Tell the class to think about whether the information that they are hearing, especially in fields such as BEST KNOWN FOR and FAMOUS SIGHTS, is important for travelers to know. For example, which would be more important to a traveler: to know that Australia is the world's leading producer of wool and bauxite (the ore from which aluminum is made), or that it is a place in which visitors can see koalas, kangaroos, and other unusual forms of animal life? *(The latter.)* Tell students that as they revise their data sheet, they should keep in mind the *audience* for whom they are compiling this information. Their audience, in this case, is travelers.

Once each student has given his or her report, and signs of inconsistencies and poor information have been amended, have the children enter their information into the data file. Tell children to be very careful that no typing errors are made.

PLAYING TRAVEL AGENT

Your students have acquired a good deal of information about countries throughout the world. They are now ready to act as classroom travel agents. As travel agents, your students will be asked to access the data file for answers to travel questions. You, the teacher, will be the first customer. Have the class, as a group, help you decide on a country to travel to on your next vacation. Give students these specifications for the country:

- It should be hot in the summer (when you will be there).
- The country's main language should be English or French.
- You would like to know at least two famous sights that you can see while you are there.

To narrow down the choices, first help students decide which fields to look in for the information you want. (CLIMATE, LANGUAGE, SIGHTS, *and* BEST KNOWN FOR *are the fields they should use.*)

Most data base programs have a function that allows users to list information in one, two, or more fields at a time. With *Scholastic PFS:file*, for example, students fill in a "Print Spec" form that tells the computer which fields to print from each record. In the above situation, students might first print out the CLIMATE and LANGUAGE fields for each country in their data file. When they have narrowed the list of possible countries down to those that are hot in summer and use either the English or French language, they can print out the SIGHTS and the BEST KNOWN FOR fields for those countries and give you a list of travel choices.

After students have worked on this sample problem together, divide them into groups of two or three. Have each child in every group take turns describing the kind of country that he or she would like to visit. See if the other student(s) in the group can use the computer to make a travel suggestion for that child.

A CAST OF CUSTOMERS

Distribute a copy of Worksheet 2, page 43, to each student. The worksheet asks children to act as travel agents for a cast of imaginary customers. These customers range from William Warmup, who wants to find, and eventually move to, a country that is warm all year; to Bilingual Betty, who is looking for a place to practice her español.

Have students use the data file to make travel suggestions for each customer on the worksheet.

STILL MORE ACTIVITIES

- You can expand your data file to include a pricing schedule. Use ads in the travel section of a local newspaper to arrive at a pricing schedule for trips from a major airport near you to each country in your data file. Enter this information into each data record through a new field, which you can call PRICE. For additional information, you might call a travel agency.
- Invite students from other classrooms to "employ" your agency. When your "customers" arrive, give them a certain amount of play money. Student agents would be responsible for offering travel suggestions from the data file, based on what customers are looking for and can afford. Have students then actually "sell" customers "tickets" to different countries.

Gail Ross-McBride teaches third grade at School of the Future/Tobin School in Cambridge, MA. ***Jackie Glasthal*** is associate editor for *Teaching and Computers*.

DATA BASE PRIMER

For Beginners Only

A data base management program is like an electronic filing cabinet or a computerized index-card box. It is a piece of software that lets you organize, store, and retrieve information.

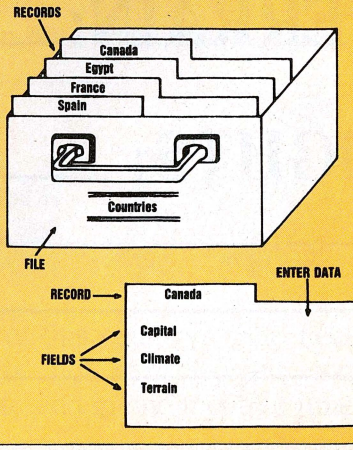
All data management programs contain three important elements: fields, records, and files.

1. Field: A field is a category or item of information. For example, in the country data file in this feature, CAPITAL, CLIMATE, and TERRAIN are all fields.

2. Record: A record is a collection or listing of related fields. In the country data file, the information in the CAPITAL, CLIMATE, and TERRAIN fields for Spain would be in one record. The CAPITAL, CLIMATE, and TERRAIN for France would be in another record.

3. File: A file is a collection of related records. The record for Spain, the record for France, and the records for all other countries would make up a file.

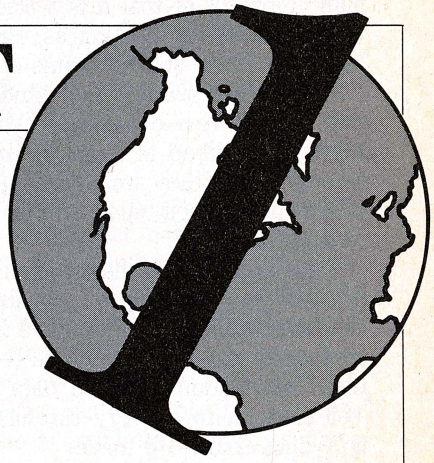
PARTS OF A DATA BASE



COPY

TRAVEL

WORKSHEET



YOUR NAME: _____

DATA RECORD ON A COUNTRY

Directions: Use reference books to find information about the country you were assigned. Write the information in the spaces provided.

COUNTRY: _____

CAPITAL: _____

CURRENCY UNIT: _____

CLIMATE: _____

TERRAIN: _____

SIGHTS: _____

_____

_____

_____

_____

CONTINENT: _____

LANGUAGE: _____

AREA: _____

BEST KNOWN FOR: _____

_____

_____

_____

OTHER: _____

_____

_____

_____

_____

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COPY

TRAVEL

WORKSHEET

YOUR NAME:_____

A CAST OF CUSTOMERS

Directions: Worldwide Travel, Inc. is open for business. Here are some of your first customers now. See if you can help each one plan his or her next vacation. Use your data file to answer the questions on the lines provided.

ARNIE AMERICAN refuses to visit a country unless English is spoken there. Suggest at least five countries he could visit.

_____

_____

Which continent in your data file has the most English-speaking countries?

_____

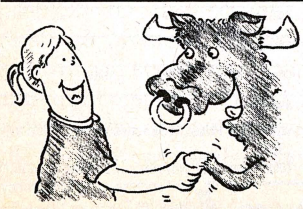
TRUDY TRAVELER loves to climb mountians. What countries do you know about where she can practice her favorite sport?

_____

_____

Can you suggest specific mountains for her to climb?_____

_____

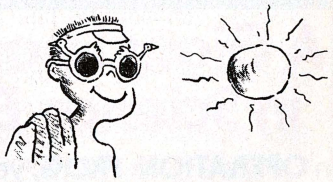


BILINGUAL BETTY is learning how to speak Spanish in school. Name at least four countries in which she can practice her new skill._____

_____

Name the monetary unit used in each of these countries._____

_____

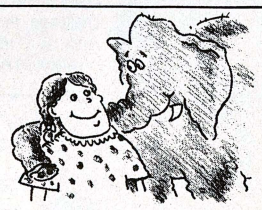


WILLIAM WARMUP cannot bear cold weather. Name a country he can fly to, and maybe even move to, and stay warm all year round.

_____

What type of terrain does this country have?

_____



KATIE KAPITAL wants to visit the capital city of a country on the continent of Asia. Can you suggest one?_____

What is the area of this country? (She needs to know whether or not her elephant could carry her from end to end in one month's time.)

_____

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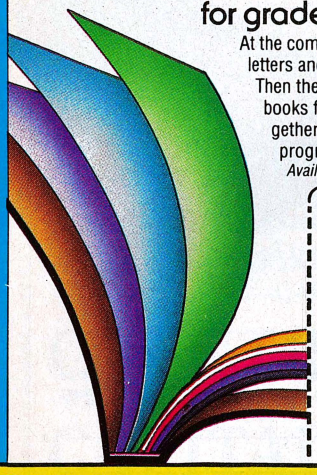

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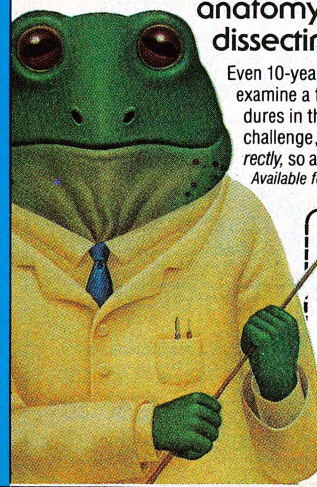

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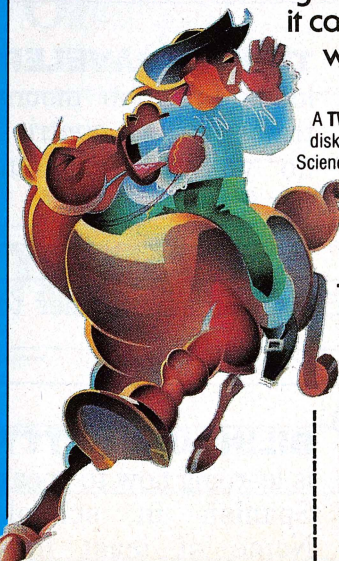

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Math Story Problems

BY WILLIAM H. KRAUS

The *Math Story Problems* program (listed on page 46) provides practice in solving story problems. However, the problems in this program are not the same old boring "Jane went to the store to buy candy" type of story problems. Rather, they're just a tad on the silly side. That's because in certain spots in each problem, the computer fills in key words at random — using either its own words or words that kids supply. The result? Some pretty zany, but fun, story problems to solve (see illustration). *Math Story Problems* is suitable for children in grades 4 to 6.

HOW THE PROGRAM WORKS

The program first tells students that the computer will present 10 story problems to be solved. It then asks if students would like to make up some of the words that go in the problems. (The alternative is to use the computer's words.)

If students choose to make up some of the words, they are asked to enter four plural nouns, two action verbs in the past tense, two adjectives, two names of places, and two names of people.

The computer then randomly selects one of the 12 story problem shells (basic outlines) provided in the listing and inserts the words kids provided, or its own words, into the problem. It also randomly selects numerical values for the problem. (The 12 story problem shells include three addition problems, three subtraction problems, three multiplication problems, and three division problems. Some of the problems contain unnecessary information, which simulates real life problem solving and encourages students to read the story problems carefully.)

Next, the computer displays the problem on the screen. Students read the problem, calculate the answer (using scrap paper), and enter it into the computer. If the answer is correct, the computer congratulates the student and adds a point to the score. If not, the computer displays the correct answer and moves on to the next problem.

For the next problem, the computer again randomly chooses a story problem shell, inserts words supplied by students or by itself, inserts random values, and displays the resulting problem on the screen. Altogether, the computer displays 10 story problems in this manner.

At the end of the program, the computer displays the student's score (out of 10 possible) and asks if he or she would like to run the program again.

Because the problems vary each time the program is run, students can use *Math Story Problems* repeatedly.

USING THE PROGRAM IN YOUR CLASS

It's no secret that students' problem solving skills are generally not as strong as their computational skills. One reason is that, rather than read the story problems thoroughly, some children simply pick out two numbers in the problem and guess at an operation (they usually choose the operation they just studied, knowing that more often than not they will be correct).

By allowing students to insert some of their own words into the problems, and by randomly presenting problems that require different math operations, the *Math Story Problems* program encourages students to pay closer attention to what the problem actually says. Reading a problem carefully is the first step toward using good problem solving skills.

Have students run through the *Math Story Problems* program individually. (They will need scrap paper to figure out answers to the problems.) If students are not familiar with the basic parts of speech, either review these before they use the program, or tell students to let the computer choose words for the story problems.

(continued)

William Kraus is chairman of the education department at Wittenberg University in Springfield, OH.

Michael Donato

COMMODORE 64 PROGRAM LISTING FOR *MATH STORY PROBLEMS*

This program listing will run as listed on Commodore 64 computers. See page 47 for a listing of an Atari BASIC version. To convert the program for use on the Apple II series and TRS-80 models of computers, see the "Conversion Chart" on page 60.

To use the *Math Story Problems* program, first put your computer in BASIC, make sure your keyboard is set in the "all caps" mode, and insert an initialized disk into the disk drive or a cassette into the cassette recorder. (Refer to your user's manual for specific instructions.)

Next, type the program listing into your computer. Be sure to type the listing exactly as it appears. Include all line numbers, punctuation marks, spaces, symbols, and letters. Also, be careful to use the "Ø" key to type a zero and the "O" key to type the letter "O."

After you have finished entering the program, run it. (Type RUN and press the RETURN or ENTER key.) If you get an error message, such as SYNTAX ERROR IN LINE 200, it means that you made a mistake on the line specified in the message. Correct any typing errors that you find and run the program again.

After you have corrected all the errors, save the program on disk or cassette. To save the program, you will have to give it a name, such as MATH. (If you don't save the program, it will be erased as soon as you turn off the computer.) You can load the program into your computer and run it as often as you like.

```
10 REM MATH STORY PROBLEMS COPYRIGHT @ 1986 BY SCHOLAST
IC INC.
20 PRINT CHR$(147):CLR:Y=RND(-TI)
30 NP=12:REM 12 TYPES OF PROBLEMS
40 DIM A(3),CA(NP),OP(NP),D$(NP),WL$(5,1)
50 REM LOAD PROBLEMS INTO MEMORY
60 FOR I=1 TO 18:READ W$:NEXT I
70 FOR I=1 TO NP:READ D$(I),OP(I),CA(I):NEXT I
80 REM INSTRUCTIONS
90 PRINT "   WELCOME TO MATH STORY PROBLEMS!"
100 PRINT:PRINT "  THIS PROGRAM WILL PRESENT 10 SLIGHTLY"
110 PRINT "SILLY STORY PROBLEMS FOR YOU TO SOLVE."
120 PRINT "  READ EACH PROBLEM AND ENTER THE"
130 PRINT "ANSWER INTO THE COMPUTER. (USE PAPER TO"
140 PRINT "DO THE MATH.)"
150 PRINT:PRINT "  IF YOU LIKE, YOU CAN MAKE THE STORY"
160 PRINT "PROBLEMS SOUND EVEN SILLIER BY PUTTING"
170 PRINT "YOUR OWN WORDS INTO THEM."
180 RESTORE:PRINT:PRINT "  DO YOU WANT TO PICK YOUR OWN
 WORDS"
190 PRINT "FOR THE PROBLEMS? (TYPE 'Y' OR 'N' AND"
200 PRINT "PRESS RETURN.)"
210 INPUT W$:IF W$="Y" OR W$="YES" THEN GOSUB 2000:GOTO 240
220 IF W$<>"N" AND W$<>"NO" THEN 210
230 GOSUB 1000
240 S=0:FOR P=1 TO 10:REM DISPLAY 10 PROBLEMS
250 PRINT CHR$(147):PRINT "PROBLEM #";P:PRINT
260 REM SELECT WORDS AND PROBLEMS AT RANDOM
270 FOR I=0 TO 5:Q=INT(RND(1)*2)
280 WD$(I)=WL$(I,Q):NEXT I
290 X=INT(RND(1)*NP)+1
300 REM SELECT VALUES AT RANDOM
310 CA=CA(X):IF OP(X)=2 THEN 340
320 FOR I=0 TO 2:A(I)=INT(RND(1)*40)+10:NEXT I
330 A(3)=A(1)+A(2):GOTO 360
340 FOR I=0 TO 2:A(I)=INT(RND(1)*15)+2:NEXT I
350 A(3)=A(1)*A(2)
360 GOSUB 3000:PRINT:INPUT W$:Q=VAL(W$)
370 REM CHECK FOR CORRECT RESPONSE
380 PRINT:PRINT: IF Q=A(CA) THEN PRINT "CORRECT!":S=S+1
:GOTO 400
390 PRINT "SORRY, THE CORRECT ANSWER IS ";A(CA);"."
400 PRINT:PRINT:PRINT "  PRESS RETURN TO CONTINUE.":INP
UT W$:NEXT P
410 REM DISPLAY FINAL SCORE AND END PROGRAM
420 PRINT CHR$(147):PRINT "  YOU HAD ";S;" OUT OF 10 CO
RRECT."
430 PRINT:PRINT:PRINT "  DO YOU WANT TO PLAY AGAIN (Y/N)?"
440 INPUT W$:IF W$="N" OR W$="NO" THEN PRINT "  GOODBYE
....":END
450 IF W$<>"Y" AND W$<>"YES" THEN 440
460 PRINT:PRINT "  DO YOU WANT THE SAME WORDS (Y/N)?"
470 INPUT W$:IF W$="N" OR W$="NO" THEN 180
480 IF W$="Y" OR W$="YES" THEN 240
490 GOTO 470:REM ERROR TRAP
1000 REM COMPUTER CHOOSES WORDS
1010 FOR I = 0 TO 5:FOR J=0 TO 1
1020 READ WL$(I,J):NEXT J:NEXT I
1030 FOR I=1 TO 6:READ W$:NEXT I:RETURN
1040 DATA DUCKS,ROBOTS,DAISIES,MONSTERS,TICKLED,CHASED,
GIGANTIC
1050 DATA NOISY, HOUSE, WOODS, MICHAEL, TINA
2000 REM STUDENT ENTERS WORDS
2010 FOR I=1 TO 12:READ WD$:NEXT I
2020 PRINT CHR$(147)
2030 FOR I=0 TO 5
2040 READ W$:PRINT:PRINT "  PLEASE ENTER ";W$;"."
2050 PRINT "  PRESS RETURN."
2060 INPUT WL$(I,0):IF WL$(I,0)="" THEN 2060
2070 PRINT:PRINT "  PLEASE ENTER ANOTHER ONE."
2080 INPUT WL$(I,1):IF WL$(I,1)="" THEN 2080
2090 NEXT I:RETURN
2100 DATA A PLURAL NOUN THAT IS NOT A PLACE
2110 DATA ANOTHER PLURAL NOUN THAT IS NOT A PLACE
2120 DATA AN ACTION VERB IN THE    PAST TENSE (SUCH AS
HUGGED), AN ADJECTIVE
2130 DATA THE NAME OF A PLACE (SUCH AS HOUSE). DON'T US
E A PROPER NAME
2140 DATA THE NAME OF A PERSON
3000 REM DISPLAY PROBLEMS
3010 WL=0:LL=39:W$="":Q=0:P$=D$(X):PL=LEN(P$)
3020 Q=Q+1:WL=WL+1:IF Q>PL THEN PRINT:RETURN
3030 Q$=MID$(P$,Q,1):IF Q$>"@" THEN W$=W$+Q$:GOTO 3020
3040 IF Q$>="0" AND Q$<="9" THEN 3080
3050 IF Q$=";" THEN Q$=","
3060 W$=W$+Q$:IF Q$=CHR$(32) OR Q$="?" THEN 3110
3070 GOTO 3020
3080 Z=VAL(Q$):IF Z<4 THEN W$=STR$(A(Z)):GOTO 3100
3090 W$=WD$(Z-4)
3100 WL=LEN(W$):GOTO 3020
3110 LL=LL-WL:IF LL<0 THEN PRINT:LL=39-WL
3120 PRINT W$;:W$="":WL=0:GOTO 3020
5000 REM STORY PROBLEMS
5100 DATA 9 SAW 2 7 4 IN THE 8. THERE WERE 3 4 ALTOGETH
ER. HOW MANY WERE NOT 7?
5150 DATA 1,1
5200 DATA 1 4 6 SOME 7 5. EACH OF THE 4 6 2 7 5. HOW MA
NY 7 5 WERE 6 IN ALL?
5250 DATA 2,3
5300 DATA 9 6 3 5. IF 9 6 2 5 PER HOUR; HOW MANY HOURS
DID IT TAKE 9 TO FINISH?
5350 DATA 2,1
5400 DATA 0 4 WERE IN THE 8; 1 4 EAST OF IT; 2 4 WEST.
HOW MANY WEREN'T IN THE 8?
5450 DATA 1,3
5500 DATA 9 HAD 3 5 AND 0 4. WHEN 9 6 THE 5; 2 RAN AWAY
. HOW MANY 5 WERE LEFT?
5550 DATA 1,1
5600 DATA 1 4 AND 2 PALS EACH PLANTED A 7 TREE. HOW MAN
Y 7 TREES DID THEY PLANT?
5650 DATA 1,3
5700 DATA 1 4 EACH PLANTED 2 7 TREES IN THE 8. HOW MANY
 7 TREES DID THEY PLANT?
```

```
5750 DATA 2,3
5800 DATA 9 HAD 3 5. 9 PUT AN EQUAL NUMBER IN 2 BAGS. T
HAT'S HOW MANY 5 PER BAG?
5850 DATA 2,1
5900 DATA 9 HAD 1 7 4 AND 2 NOT SO 7 4. 9 ALSO HAD 0 7
5. HOW MANY 4 DID 9 HAVE?
5950 DATA 1,3
6000 DATA THERE WERE 1 COWS; 0 4; AND 3 5. HOW MANY MOR
E 5 THAN COWS WERE THERE?
6050 DATA 1,2
6100 DATA 3 7 4 SPLIT INTO 1 EVEN GROUPS. HOW MANY 7 4
WERE IN EACH GROUP?
6150 DATA 2,2
6200 DATA HOW MANY 5 COULD 1 WOODCHUCKS CHUCK IF EACH W
OODCHUCK COULD CHUCK 2 5?
6250 DATA 2,3
```

ATARI PROGRAM LISTING FOR *MATH STORY PROBLEMS*

This program will run as listed on the Atari series of computers. A listing of the program for Commodore 64 computers appears on page 46. Conversions for the Apple series and TRS-80 models of computers are based on the Commodore listing and appear in the "Conversion Chart" on page 60.

```
10 REM MATH STORY PROBLEMS @ 1986 BY SCHOLASTIC INC.
20 PRINT CHR$(125):CLR :GRAPHICS 0
30 DIM Q$(1),W$(20),P$(200),T$(100),N(3),WL$(192),A(3),
R(5),WD$(16)
40 NP=12:GOTO 200
50 REM Display problem
60 LL=37:WL=0:Q=0:PL=LEN(P$)
70 Q=Q+1:WL=WL+1:IF Q>PL THEN PRINT :RETURN
80 Q$=P$(Q,Q):W$(WL)=Q$:IF Q$>"@" THEN 70
90 IF Q$=" " OR Q$="?" THEN 180
100 IF Q$>="0" AND Q$<="9" THEN 130
110 IF Q$=";" THEN W$(WL)=","
120 GOTO 70
130 X=VAL(Q$):IF X<4 THEN W$=STR$(A(X)):GOTO 170
140 Y=R(X-4):W$=WL$(Y,Y+15):X=17
150 X=X-1:IF W$(X,X)=" " THEN 150
160 W$=W$(1,X)
170 WL=LEN(W$):GOTO 70
180 LL=LL-WL:IF LL<0 THEN PRINT :LL=37-WL
190 PRINT W$;:WL=0:GOTO 70
200 REM Instructions
210 PRINT "  Welcome to Math Story Problems!"
220 PRINT :PRINT "  This program will present 10"
230 PRINT "slightly silly story problems for you"
240 PRINT "to solve. Read each problem as it"
250 PRINT "appears. Then enter the answer into"
260 PRINT "the computer. (Use paper to do the"
270 PRINT "math.)"
280 PRINT :PRINT "  If you like, you can make the pro-"
290 PRINT "blems sound even sillier by putting"
300 PRINT "your own words into them."
310 PRINT :PRINT "  Do you want to pick your own words"
320 PRINT "for the problems (y/n)?"
330 INPUT W$:IF W$="Y" OR W$="y" THEN GOSUB 1600:GOTO 360
340 IF W$<>"N" THEN PRINT "Type Y or N and press RETURN
.":GOTO 330
350 GOSUB 1500
360 S=0:FOR P=1 TO 10:REM 10 problems
370 GRAPHICS 0:PRINT "Problem #";P:PRINT
380 REM randomly select words & problems
390 FOR J=0 TO 5:R(J)=32*J+16*INT(RND(1)*2)+1:NEXT J
400 X=INT(RND(1)*NP)
410 RESTORE 2010+10*X:READ P$
420 REM generate values
430 READ OP,CA
440 IF OP=2 THEN 470
450 FOR J=0 TO 2:A(J)=INT(RND(1)*40)+10:NEXT J
460 A(3)=A(1)+A(2):GOTO 490
470 FOR J=0 TO 2:A(J)=INT(RND(1)*15)+2:NEXT J
480 A(3)=A(1)*A(2)
490 GOSUB 50
500 PRINT :TRAP 900:INPUT W$:Q=VAL(W$):TRAP 40000
510 PRINT :PRINT :IF Q=A(CA) THEN PRINT "Correct!":S=S+
1:GOTO 530
520 PRINT "Sorry, the correct answer is ";A(CA);"."
530 PRINT :PRINT :PRINT "Press RETURN to continue.":INP
UT Q$:NEXT P
540 GRAPHICS 0:PRINT "You had ";S;" out of 10 correct."
550 PRINT :PRINT :PRINT "Do you want to play again (Y/N)";
560 INPUT Q$:IF Q$="N" THEN PRINT "Goodbye....":END
570 IF Q$<>"Y" THEN PRINT "Type Y or N and press RETURN
.":GOTO 560
580 PRINT :PRINT "Do you want to use the same":PRINT "w
ords (Y/N)";
590 INPUT Q$:IF Q$="N" THEN 310
600 IF Q$="Y" THEN 360
610 PRINT "Type Y or N and press RETURN.":GOTO 590
900 PRINT "Please type only a number.":GOTO 500
950 FOR I=0 TO 23:WL$(I*8+1)="        ":NEXT I:RETURN
1500 REM Use computer's words
1510 GOSUB 950:RESTORE 1540:FOR I=0 TO 11
1520 READ W$:WL$(I*16+1,I*16+LEN(W$))=W$
1530 NEXT I:RETURN
1540 DATA robots,ducks,daisies,monsters,tickled,chased,
gigantic,noisy,house,woods,Michael,Tina
1600 REM Student enters words
1610 GRAPHICS 0:POKE 702,0:PRINT "Enter the words as I
ask for them."
1620 PRINT "The words should be 16 letters or     less.
":PRINT
1630 GOSUB 950:RESTORE 1710:FOR I=0 TO 5
1640 READ T$:PRINT "Please type ";T$;"."
1650 INPUT WD$:IF WD$="" THEN 1650
1660 WL$(I*32+1,I*32+LEN(WD$))=WD$
1670 PRINT :PRINT "And now type another one."
1680 INPUT WD$:IF WD$="" THEN 1680
1690 WL$(I*32+17,I*32+16+LEN(WD$))=WD$
1700 PRINT :NEXT I:POKE 702,64:RETURN
1710 DATA a plural noun,another plural noun,an action v
erb in the     past tense,an adjective
1720 DATA a place (for ex: house)
1730 DATA the name of a person
2000 REM Story problems
2010 DATA 9 saw 2 7 4 in the 8. If there were 3 4 altog
ether; how many were not 7?,1,1
2020 DATA 1 4 6 some 7 5. If each of the 4 6 2 7 5; the
n they 6 how many 7 5 altogether?,2,3
2030 DATA Last week 9 6 3 5. If 9 6 2 5 per hour; how m
any hours did it take 9 to finish?,2,1
2040 DATA There were 0 4 in the 7 8; 1 4 north of the 8
; and 2 4 south of it. How many 4 were not in the 7 8?,
1,3
2050 DATA 9 had 3 5 and 0 4. When 9 6 the 5; 2 of them
disappeared. How many 5 did 9 have left?,1,1
2060 DATA 1 4 and 2 of their friends each planted a 7 t
ree in the 8. How many 7 trees did they plant?,1,3
2070 DATA 1 4 each planted 2 7 trees in the 8. How many
 7 trees did they plant?,2,3
2080 DATA 9 had 3 7 5. 9 put an equal number of 5 into
2 bags. How many 7 5 were in each bag?,2,1
2090 DATA 9 had some 4. 1 of the 4 were 7; but the othe
r 2 were not. 9 also had 0 7 5. How many 4 did 9 have?,
1,3
2100 DATA There were 1 woodchucks; 0 4; and 3 5 in the
8. The 5 outnumbered the woodchucks by how many?,1,2
2110 DATA 3 7 4 split into 1 even groups. How many 7 4
were in each group?,2,2
2120 DATA How many 5 could 1 woodchucks chuck; if each
woodchuck could chuck 2 5?,2,3
```

Variables/Error Checking

BY SANDRA MARKLE

In this final installment of the "BASIC Challenge Cards" column, beginning programmers learn how to use variables; intermediate programmers learn how to anticipate and check for errors in a program.

The column includes two activity cards for beginners and two activity cards for intermediate level students (see pages 49 and 51). Accompanying the cards is a section of teachers' notes that defines the new commands and provides learning objectives and answers to the task card activities.

BEGINNER TASK CARD CONCEPTS

Variables are letters that stand for numbers or words. As the name implies, the letters or words assigned to the variable can vary.

For example, in line 10 of the following program, the value of 1 is assigned to the variable A. In line 30, the value of A is changed to 2 (1+1).

```
NEW
10 A=1
20 PRINT A
30 A=A+1
40 PRINT A
50 END
```

Put your computer in BASIC, enter the program, and run it. The computer will display the numbers 1 and 2 on the screen. Here's how it works:

In line 10, the computer labels a spot in its memory with the letter "A" and stores the value 1 in it. By giving the memory location such a label (called an *address*), the computer can more easily locate the information stored in that location.

In line 20, the computer displays the value of A (1) on the screen. In line 30, the computer adds 1 to the current value of A and stores the new value in the memory location coded "A." In effect, the new value replaces the old value of A.

The PRINT A command in line 40 instructs the computer to retrieve the current value stored in the memory address A and display it on the screen. Line 50 instructs the computer to stop processing.

The INPUT command is another way to assign values to variables. To see how it works, enter the following program into your computer.

```
NEW
10 PRINT "ENTER A NUMBER AND
PRESS RETURN/ENTER."
20 INPUT A
30 PRINT A
40 GOTO 10
```

Line 10 prompts the user to enter a number. (The computer will not continue with the program until the user does so.) As soon as a number is entered, the computer labels a memory location with the code address "A" and stores the user's number in that location. As before, the computer then displays the current value of A on the screen.

The GOTO command in line 40 directs the computer to start the program over. The second time through, the user can enter another number in line 10. The new number then replaces the old number in the memory location "A" and is displayed on the screen.

Run the program and enter different numbers. To stop the program, press the BREAK key (Atari, TRS-80), the RUN/STOP and RESTORE keys (Commodore), or the CTRL and C keys (Apple).

From this exercise, you can see that the INPUT command is useful when you want to use a single program to process many values.

The INPUT command can also accept more than one value at a time. For example, change line 20 of the program to: 20 INPUT A,B. Run the program again. This time, enter two values separated by a comma. The first value is assigned to memory location A and the second value is assigned to memory location B.

As we mentioned before, variables can stand for letters as well as numbers. Variables that stand for letters are called *string variables* and always end with a $ sign, called a *string*. Enter this program into your computer and run it:

```
NEW
10 PRINT "ENTER YOUR NAME AND
PRESS RETURN/ENTER."
20 INPUT N$
30 END
```

In line 20, the computer assigns whatever name you enter to the memory address N$ (pronounced *en string*).

On almost all computers, the names of numeric and string variables can be one or two characters and must always start with a letter. (Some computers will accept variable names that are longer.) Examples of acceptable variables include: G, F1, RE, P$, Q1$, CN$.

INTERMEDIATE TASK CARD CONCEPTS

Program errors can happen in two ways. First, the program can contain an error within the listing, such as a misspelled command. Second, the user can enter the wrong type of information in response to a program prompt.

To avoid the first type of error, students will have to check their listings carefully for "bugs," or mistakes. The most effective way to do this is to run the program. If there is an error, the computer will respond with an error message.

Here is a list of the most common error messages:

- SYNTAX ERROR indicates that a command is misspelled or that the order of information in a line statement is incorrect. 10 PRUNT "HELLO" and 10 "HELLO" PRINT would both generate SYNTAX ERROR messages.
- UNDEFINED LINE NUMBER means that the line number after a GOTO or GOSUB command was mistakenly omitted, or that the line number specified after GOTO or GOSUB does not exist in the program.
- RETURN WITHOUT GOSUB is a reminder that the END command is missing from the main routine. (For more information on the paired commands GOSUB. . .RETURN, see the February 1986 "BASIC Challenge Cards" column.)
- FOR WITHOUT NEXT (or NEXT WITHOUT FOR) is a reminder that one part of the paired command FOR . . .NEXT is missing.
- TYPE MISMATCH means that a numeric or letter value was assigned to the wrong kind of variable.

(continued on page 50)

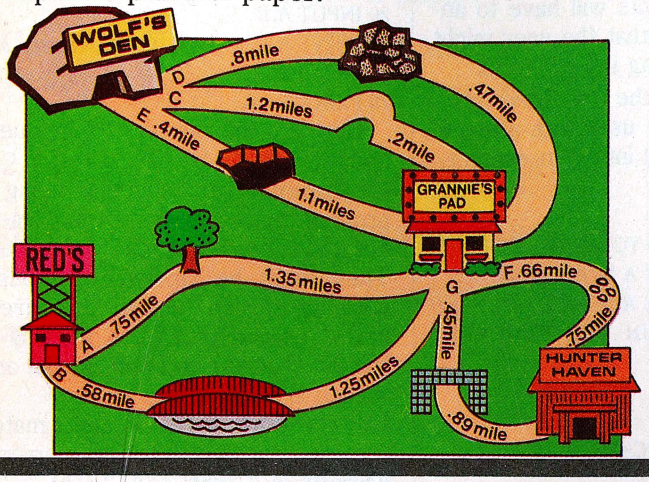
CUT OUT AND LAMINATE

BEGINNER

BASIC TASK CARD

13 FOLLOW THAT TRAIL!

This program will help you find the quickest way for Little Red Riding Hood, the Big Bad Wolf, and Grandma to get from place to place. To make it work, fill in the missing commands. Then run it and answer the questions on a separate piece of paper.




```
NEW
10 PRINT "ENTER THE NUMBERS TO BE ADDED"
20 _____:REM ACCEPT VALUES FOR VARIABLES A AND B
30 _____:REM DISPLAY A
40 PRINT "+"
50 _____:REM DISPLAY B
60 PRINT "="
70 _____:REM DISPLAY SUM OF A AND B
80 END
```

Questions:

1. Is A or B the shortest trail from Little Red Riding Hood's house to Grandma's?
2. The Big Bad Wolf wants to beat Red Riding Hood to Grandma's. Should he take trail C, D, or E?
3. Grandma sees the wolf coming. She wants to escape to the Hunter's hut. Should she take trail F or G?

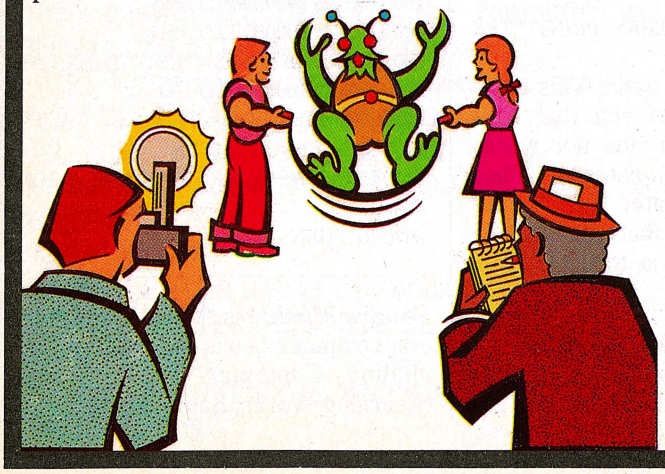
ANSWERS: Check with your teacher.

BEGINNER

BASIC TASK CARD

14 SILLY HEADLINES

This program writes silly newspaper headlines. To make it work, find and fix the three bugs in it. Then type it into your computer, run it, and follow the instructions on the screen. Copy the headlines on a separate piece of paper.



```
NEW
10 PRINT "ENTER TWO ADJECTIVES:"
20 INPUT A$,B$,X$
30 PRINT "ENTER THREE SINGULAR NOUNS:"
40 INPUT C$,D$,E$
50 PRINT "ENTER TWO VERBS:"
60 INPUT F,G$
70 PRINT A$;" MOTHER SEES CHILD ";F$;" WITH ALIENS!"
80 PRINT "ATHLETES GIVEN ";C$;" BY COACH'S ";D$
90 PRINT "FARMER ";G$;" A ";B;" PIG!"
100 PRINT "DOG HAS ";E$
110 END
```

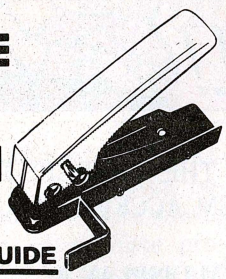
Note: If you are using an Atari computer, add this line: 1 DIM A$(20),B$(20),X$(20),C $(20),D $(20),E$(20),F$(20),G$(20)

ANSWERS: Check with your teacher.

Circle 20 on Reader Service Card.

NOW USE BOTH SIDES
OF YOUR DISKETTE!

5¼"
DISKETTE
HOLE
PUNCH



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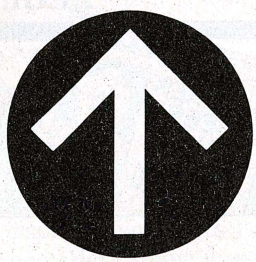
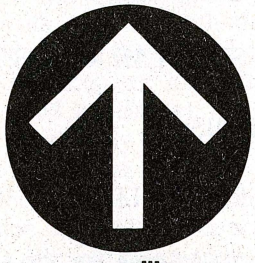
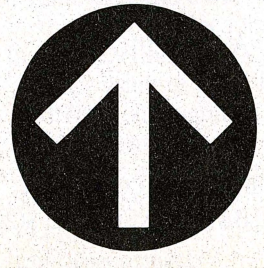


go for it!



use your library



American Library Association

BASIC CHALLENGE CARDS

(continued from page 49)

● OUT OF DATA indicates that the computer has been instructed to READ more DATA than is present in the program. (For more information on the paired commands READ . . .DATA, see last month's "BASIC Challenge Cards" column.)

To avoid the second kind of program error, one caused by erroneous user input, students will have to anticipate mistakes that the user might make while running the program.

For example, the following program presents the user with a menu of choices. Enter it into your computer and run it.

```
NEW
10 PRINT "WHAT DO YOU WANT TO DO?"
20 PRINT " 1. CLIMB A MOUNTAIN."
30 PRINT " 2. WRITE A NOVEL."
40 PRINT " 3. RUN THE PROGRAM AGAIN."
50 INPUT N
60 IF N=3 THEN 10
70 PRINT "GOOD LUCK!"
80 END
```

In response to the question "What do you want to do?" enter the words RUN THE PROGRAM AGAIN and press RETURN. Because you entered words and the computer expected a number (N is a numeric variable), you got an error message. Run the program again. This time, enter the number 6. The computer displayed the words GOOD LUCK!, even though "6" is not a valid choice on the menu.

To avoid these kinds of errors, students must use a technique called *error checking* (also called *error trapping*). For example, add these lines to the program:

```
45 PRINT "ENTER 1, 2, OR 3 AND PRESS RETURN/ENTER."
55 IF N<1 OR N>3 THEN PRINT "TRY AGAIN.": GOTO 45
```

Run the program again. This time, the computer warns you that it is expecting a number and not words (line 45). Also, if you enter a number less than 1 or greater than 3, the computer indicates that you made a mistake and asks you to enter your choice again.

USING THE TASK CARDS

Here are the learning objectives and answers for each of the four BASIC task cards.

Beginner #13: Students complete a program that uses numeric variables to calculate the shortest route between two points. They then use the program to compare distances on a map. They must be familiar with decimals. *Answers:* Here are the missing commands.

```
20 INPUT A,B
30 PRINT A
50 PRINT B
70 PRINT A+B
```

Here are the answers to the questions: (1) B; (2) D; (3) G.

Beginner #14: Students debug a program that uses string variables to create silly newspaper headlines. They must be familiar with basic parts of speech (nouns, adjectives, verbs). *Answers:* Delete the X$ in line 20, change F to F$ in line 60, and change B to B$ in line 90.

Intermediate #13: Students match error messages with program errors. *Answers to Activity 1:* (a) 2; (b) 3; (c) 1; (d) 4.

Answers to Activity 2: (a) RETURN WITHOUT GOSUB; (b) SYNTAX ERROR; (c) UNDEFINED LINE STATEMENT; (d) NEXT WITHOUT FOR; (e) TYPE MISMATCH; (f) TYPE MISMATCH; (g) FOR WITHOUT NEXT; (h) OUT OF DATA.

Intermediate #14: Students debug a program and then add line statements that provide error checking. The program displays invitations to a party. Here is the finished program (other solutions are possible):

```
110 PRINT "ENTER THE DATE OF THE PARTY."
120 GOSUB 2000:INPUT DA$
140 GOSUB 2000:INPUT TI$
160 GOSUB 2000:INPUT PL$
180 GOSUB 2000:INPUT PH$
190 READ FD$:IF FR$="END" THEN END
200 GOSUB 1000:GOTO 190
1080 RETURN
2000 REM ERROR CHECK
2010 PRINT "(PLEASE DON'T USE A COMMA.)"
2020 RETURN
```

Sandra Markle is the author of several computer books for children, including *Computer Tutor Junior* (Learning Works, Santa Barbara, CA).

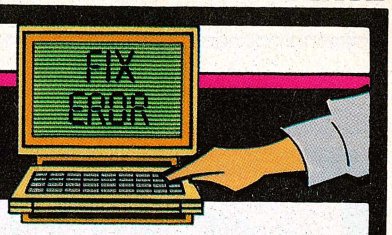
CUT OUT AND LAMINATE

INTERMEDIATE

13

BASIC TASK CARD

ERROR MESSAGESSS



ACTIVITY 1

Each of the commands in the left column has an error in it. Match each with the error message (at right) that it would cause the computer to display. Then fix the error. Write your answers on a separate piece of paper.

Commands	Error Messages
1. "A+B" PRINT	a. TYPE MISMATCH
2. A$=9	b. OUT OF DATA
3. READ A,B,C,D: DATA 1,2,3	c. SYNTAX ERROR
	d. FOR WITHOUT NEXT
4. FOR A=1 TO 10:END	

ACTIVITY 2

Each of the commands that follows has an error in it. Guess what error message each one would make the computer display. Write your answers on a piece of paper. Then type the commands into your computer and check your answers.

a. PRINT A$:RETURN
b. PRIT A
c. GOTO 5
d. PRINT A$:NEXT A$
e. A="P"
f. READ A:DATA JIM
g. FOR Z=1 TO A:PRINT Z
h. READ Z$,F$:DATA 1

ANSWERS: Check with your teacher.

INTERMEDIATE

14

BASIC TASK CARD

You're Invited...

This program is supposed to display party invitations. To make it work, follow these steps.

1. Find and fix five errors in the program.
2. Add lines that check for user input errors. For example, tell users not to put a comma in their answer. (If they do, the computer will display an EXTRA IGNORED message.)
3. If you have a printer, make the program print the invitations on paper.

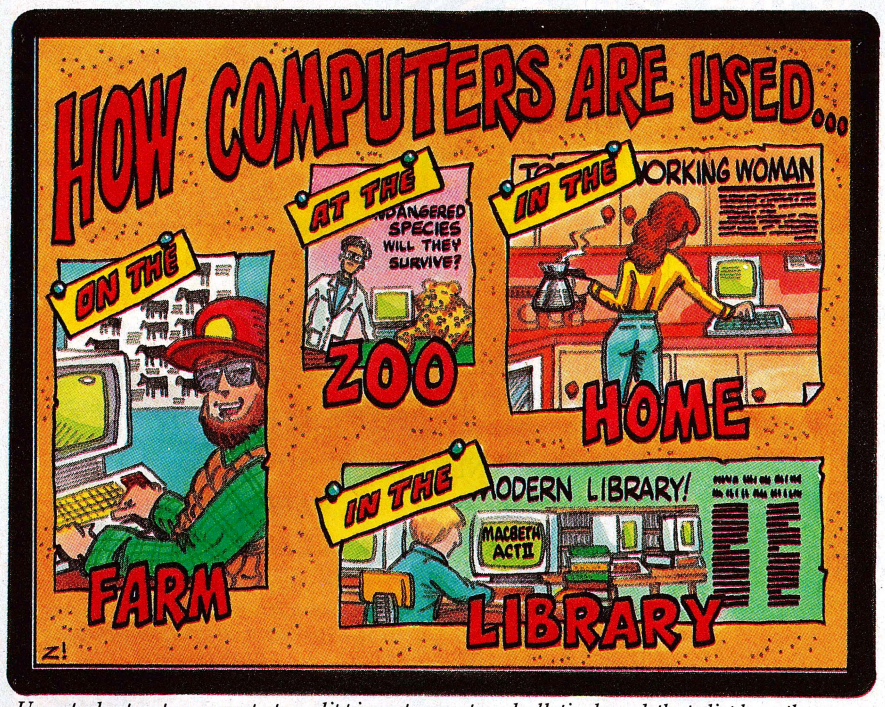
```
10 DATA CLARK KENT, SUZY SIMMS, TODD ABBOTT
99 DATA END
100 REM ENTER PARTY INFORMATION
110 PRIN "ENTER THE DATE OF THE PARTY."
120 INPUT DA$
130 PRINT "ENTER THE TIME OF THE PARTY."
140 INPUT TI$
150 PRINT "ENTER THE PLACE OF THE PARTY."
160 INPUT PL
170 PRINT "ENTER YOUR PHONE NUMBER."
180 INPUT PH$
190 READ FD$:IF FR$="STOP" THEN END
200 GOSUB 2000:GOTO 190
1000 REM DISPLAY CARD
1010 PRINT:PRINT:PRINT "DEAR ":FR$;","
1020 PRINT:PRINT " YOU'RE INVITED TO A BIRTHDAY PARTY!"
1030 PRINT:PRINT:PRINT "DATE: ";DA$
1040 PRINT:PRINT "TIME: ";TI$
1050 PRINT:PRINT "PLACE: ";PL$
1060 PRINT:PRINT:PRINT "CALL TO LET US KNOW IF YOU PLAN TO COME."
1070 PRINT "PHONE: ";PH$
```

Note: If you are using an Atari computer, add this line: 1 DIM FR$(40),DA$(20),TI$(20),PL$(20),PH$(20)

ANSWERS: Check with your teacher.

MICRO IDEAS

QUICK COMPUTER TIPS AND ACTIVITIES



Use student art or newspaper clippings to create a bulletin board that displays the many different ways computers are used in our world.

"COMPUTERS IN SOCIETY" BULLETIN BOARD

Have students learn how computers are used in society by creating a bulletin board that depicts some of these ways.

First, help students make a list of places in society where computers are used *(banks, libraries, supermarkets, schools, hospitals, police stations, fire departments, farms, and so on)*.

Ask students to draw, or find in a magazine or newspaper, a picture of a computer used in one of these occupations. Or, challenge students to find a picture of an occupation not mentioned in class.

Have kids give short presentations about the computer they have selected. How does it work? Who uses it? How is it helpful? Post the best pictures on a bulletin board, and label the board "How Computers Are Used.. . ." Before each picture, tack to the board the words "In the," and then add the word(s) for the setting of that picture. For example, "In the Library," "In the Home," "In the School," and so on. In some cases you may have to change the words "in the" to "on the." "On the Farm" is one example.

Carolyn Harmon
Springfield, IL

QUICK TIPS

- Each day, assign a different computer term as the day's "password." Require students to repeat the password and its correct computer definition before giving them permission to enter the computer station.

- On a disk, keep a year-long diary of your curricular activities — of what worked and what didn't. At the beginning of each year, check through the diary, deleting anything not worth repeating. Then, use what *did* work to help you plan for the coming year.

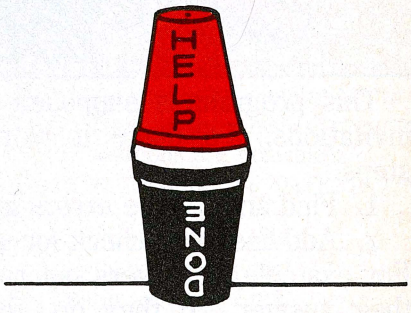
- Use word processing software to design a questionnaire on this year's activities. Have each outgoing student use the word processor to complete a questionnaire. Collect a printout of each student's response and review them at your leisure.

A QUIET, ORGANIZED WAY TO CALL FOR HELP

When your class is using the computer lab, does it seem as though every student demands your attention at the same time? You can provide an organized way to cut down on the confusion this produces, and also guarantee that every child will eventually receive your input, by creating a *visicup* for each child.

A visicup consists of two different colored Styrofoam cups taped together, rim to rim. When a child puts a visicup on top of his or her computer monitor, the teacher knows that either: (1) the student has a question, or (2) the student is ready to have work corrected. How does the teacher know whether it is a question or work that needs correcting? It depends on which color cup in the visicup is resting on top.

To create a visicup, fill one of two Styrofoam cups one-third full of birdseed or sand. (This gives your visicup stability.) Now tape the two cups together, rim to rim. Use tempera paints with a few drops of liquid soap in each (for adhesiveness) to paint the two cups different colors. For easiest visibility, use contrasting colors such as red and black.



When the paint dries, use a felt-tip marker or crayon to write "done" on one of the cups. Now turn the cups, so that the word "done" is upside down. Write "help" on the other cup. Tell students to put the "help" side of their visicup on top when they need assistance. They should have the cup with the word "done" on top when they are ready to have their work checked. At other times, the visicups should be kept out of sight.

Georgia Homer
Springdale, PA

Ron Zalme

TEACHING and computers May/June 1986 *(Expires October 1)*

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a. ☐ Recommend type/brand
b. ☐ Approve purchase
c. ☐ Both of the above

2. What is your primary involvement with Computer Software?
a. ☐ Identify need
b. ☐ Recommend program
c. ☐ Approve purchase
d. ☐ All of the above

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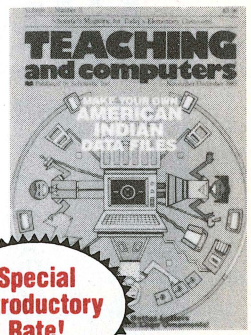

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FOREIGN LANGUAGE LEARNING, COMPUTER-STYLE

How would you say "computer" in Spanish? *(Computadora.)* What word would Spaniards use for "keyboard"? *(Teclado.)* How about "screen" or "monitor"? *(Pantallo.)* Why not add some new words to your students' foreign language vocabulary by labeling parts of your classroom computer with these foreign language words?

You might also explain to students that many words, both in English and other languages, have more than one meaning. These words are called *homonyms*. Many words associated with computers are homonyms. They take their names from words that were in the English vocabulary before there were computers. For example, a program *(programma)* is not only a written set of instructions for the computer; it is also what you receive when you go to a school recital; hardware *(equipo)* relates not only to computer machinery; it is also what you can find when you enter a hardware store. The Spanish versions of these words are also homonyms.

Other English and Spanish computer words are homonyms. These include "file" *(archivo);* "disk" *(disco);* "command" *(mando)*; "function" *(funciōn)*; and "delete" *(quitar)*. Have kids design a bulletin board in which these words and their definition(s) are explained.

Craig Dickinson
Orono, ME

PROGRAMMING FOR PRINT AND PROFIT

Computer magazines are always on the lookout for new and innovative programs to share with readers. Suggest to your students that they send their best original programs to one of these magazines for possible publication. At the least, the experience is a useful exercise in letter and program writing. At best, it can be financially rewarding. (Payment from magazines may be anything from a free copy of their publication to $150 and up.)

Before sending in a program, tell students to write to the magazine of their choice for a copy of the publication's guidelines for contributors. Most magazines have them. Guidelines often specify topics for program listings, as well as special submission policies. For example, many magazines ask that programs be submitted on a disk, and that a self-addressed, stamped envelope be enclosed.

Once students have their programs ready, have them compose a cover letter (using a business letter format) that briefly describes how their program works.

Here are the names and addresses of four computer magazines that accept programs designed by readers.

- *Antic* (Atari specific), 524 Second St., San Francisco, CA 94107.
- *3•2•1 Contact*, BASIC Training column, 1 Lincoln Plaza, New York, NY 10023
- *Family Computing*, "The Programmer" column, 730 Broadway, New York, NY 10003.
- *Teaching and Computers*, "Micro Times" column, 730 Broadway, New York, NY 10003. (Accepts short programs that teach basic educational skills).

Craig Dickinson
Orono, ME

MOVING MORE THAN 15 LINES AT A TIME

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SOFTWARE SHOWCASE

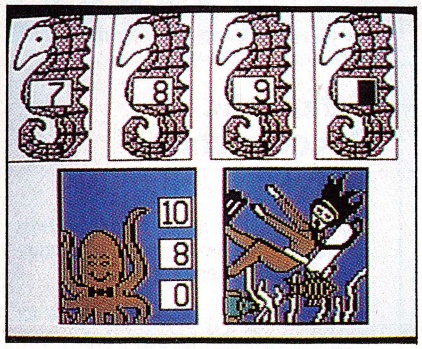
SOFTWARE RECOMMENDED FOR TEACHERS, BY TEACHERS

NUMBER SEA HUNT

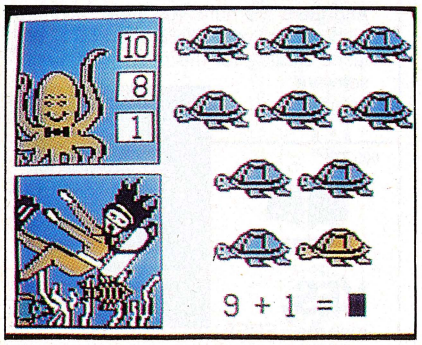
Computer: TRS-80 Models III,4; Commodore 64; Apple II series
Topic: Math
Grade Level: K–2

Number Sea Hunt is an excellent arithmetic drill that helps primary students practice counting, ordering numbers, adding, and subtracting. The program features clear and appealing graphics along with a management system that allows teachers to change the lesson format and store or print records for up to 200 students.

Students choose from four different lessons on the disk. The menu, designed for nonreaders, uses pictures to describe the lessons. In "Counting Objects," students count a group of one to 10 objects, such as turtles, on the screen. In "Number Line," students select the missing number to complete a sequence. Two groups of objects appear on the screen in "Adding Objects" and "Subtracting Objects." In these games, players select the number that is the sum or difference of the two groups, depending on the game.



Students complete the number sequence.



How many turtles? Players add them up.

An octopus and a scuba diver appear in each lesson. For each of the questions in the game, students press the spacebar to make the octopus point to one of three possible answers. Once the answer is chosen, the scuba diver provides feedback by shaking her head "yes" or "no." Correct answers also receive a musical reward.

Once all the game questions have been answered, a score screen graphically shows students how they have done. A group of clams appear on the screen. Clams with pearls represent questions answered correctly. Closed clams represent questions answered incorrectly.

The program is slow in responding to correct answers. If sound is used, the time between examples is especially lengthy. This may prove distracting to young children.

Fortunately, teachers can turn off the program's sound. Teachers can also choose the number of questions (from one to 12), and whether or not the onscreen instructions are displayed before each lesson.

Number Sea Hunt is a good, simple program for teaching numbers. Once the teacher introduces the program, students should be able to use it without help. The numbers are large enough to allow young children to distinguish them.

Price: $39.95
Policy: $54.95 includes backup; 30-day preview
Source: Gamco, Box 1911, Big Spring, TX 79721; 800/351-1404

Beth Lazerick and Kristen Sternberg
Teachers, Dalton School, New York, NY

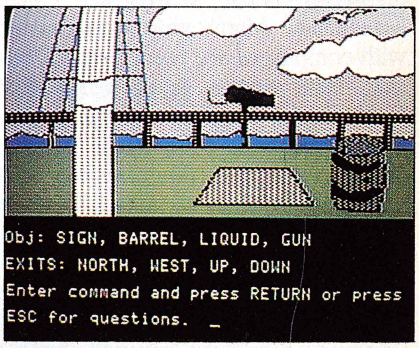
REVOLUTION AND CONSTITUTION

Computer: Apple II series
Topic: Social studies
Grade Level: 5–8

You are in the captain's cabin on a ship. The captain's log reveals the date, "November 26, 1773." A piece of paper discloses the following information: "East India Company: 80 chests and 34 half chests. Deliver to Joshua Winslow." From these clues, you must determine the event you are observing and the date it occurred. *(The event is the Boston Tea Party. The year is 1773.)*

That's the goal of *Revolution and Constitution,* one of four programs in the American History Explorer Series. Each program in the series consists of six or seven historic events that students must uncover from a variety of clues. The four programs also contain a classroom management system that keeps track of up to 50 students' progress.

The events covered by *Revolution and Constitution* are the Boston Tea Party, Battle of Yorktown, Valley Forge Encampment, passage of the Declaration of Independence, Treaty of Paris, and Washington's inauguration as the first U.S. President. Within each event, there are six or seven locations to explore. For example, locations for the Treaty of Paris include Lord Shelburne's office in London, Benjamin Franklin's quarters, and the French Foreign Ministry.



The scene gives clues to historic events.

At each location, students use one- or two-word commands to examine objects and uncover clues about the event and date. A Student Reference Sheet lists commands that the computer will understand. For example, the computer will respond to the following commands: "Go North," "Examine Flag," "Read Diary," and "Listen." On some screens, people who were involved in the event provide clues. For example, if players type "Ask Cornwallis when," the computer reveals the date of the Battle of Yorktown.

Once players think they can identify the event and date, they press ESCAPE and enter their answers. They must also identify the clues that

led them to their conclusions. The game has two levels. A playing level can either be chosen by the student or set by the teacher. The advanced level contains more difficult clues that may require additional research. For example, a location might be described by latitude and longitude measurements rather than by name. The advanced level also contains three additional research questions for each event. The questions measure mastery of the material and reinforce critical-thinking skills by encouraging students to reach deductions from available clues. For example, one research question asks, "Which two clues clearly indicate that Hamilton favored strong central power?" *(The answers are a diary and a sheet. By reading these documents, students learn of Hamilton's plans for a government treasury to assume state debts and for a national bank to handle the government's money.)*

The classroom management system allows teachers to monitor records for up to 50 students and select the difficulty level and specific event each student will start on. The average amount of time needed to complete an event is about 20 minutes. A STOP command allows students to quit working and save their current progress in an adventure.

The documentation is very helpful. It contains educational objectives, operating directions, classroom management instructions, and a variety of support materials, such as a reproducible Explorer's Log on which students can record locations, objects, and clues for each adventure, six reproducible Student Activity Sheets that reinforce and expand on the program's learning concepts, and suggestions for related activities.

The research of educational materials used to plan *Revolution and Constitution* is obvious and on-target. The program contains excellent graphics and explicit instructions. It is a fresh approach to logical reasoning and encourages creative thinking.

Revolution and Constitution would be most useful as a supplement to a more thorough social studies unit. The program offers a creative, fun

(continued)

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(continued from page 55)

way to reinforce facts about American history. Unfortunately, the program discourages quick and creative deductions by requiring students to examine every clue so they can determine the "most valuable" clues at the end of each adventure. Students who can't correctly rate the value of the clues must repeat an adventure, even if they already named the correct event.

Price: $39.95
Policy: Backup included; 30-day preview
Source: Mindscape Inc., 3444 Dundee Road, Northbrook, IL 60062; 312/480-7667

Beth Lazerick and Kristen Sternberg
Teachers, Dalton School, New York, NY

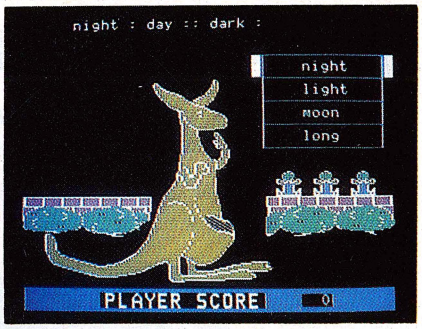
SOCMATE

Computer: Apple II series
Topic: Language arts
Grade Level: 2–7

Teachers bombard young students with standardized tests that contain analogies, yet we rarely offer them practice in this area. *SocMate* contains three games that allow elementary students to practice analogies and increase their vocabulary and reasoning skills at the same time.

The games are clever and challenging. In the Kangaroo game, three of four words that make an analogy are given, such as *above:over:below:?*. Players choose the word that completes the analogy from four possibilities, such as *under, tree, ground,* and *space. (The answer is "under.")* The Koala game is similar to the Kangaroo game, but the missing word can appear in any position, such as *life: ?:happy: sad.* In the Sheep game, a word pair is shown at the top of the screen, such as *Chicago:Denver.* Players choose a second word pair to complete the analogy. In this case, the answer is *Illinois:Colorado.* All three games provide appropriate and immediate feedback for correct and incorrect answers.

Players can set game features, such as the number of players (1–2), the speed (0 = off, 1 = slow through 9 = fast), the game length (2–5 minutes), and sound (on or off). They can use the keyboard or an alternative input device to enter their responses.



A sample SocMate *analogy.*

Players can vary the game level by choosing one or more types of analogies for each game. Eight types are possible, including synonyms, antonyms, functions, homonyms, categories, linear words, word games, and transpositions. The disk contains 6,400 analogies.

SocMate is part of a series of six programs designed to develop thinking skills, including classification, association, and sequence skills. To accompany the six programs, teachers can buy a disk called *SocAssist* ($19.95) that monitors student performance in all the programs. *SocAssist* provides a printout of every student's scores. Along with the scores, it provides the game level on which each score was achieved, the number of correct answers achieved in each game, and more. You can also print out the items a particular student missed and let him or her use the printout as a study sheet.

The manual covers the operation of all six programs in the series. Unfortunately, it doesn't contain detailed information about the contents of *SocMate,* nor does it provide help in explaining analogies to students.

SocMate is a highly motivating and comprehensive tool for working with analogies at the elementary level. It gives students needed practice in seeing relationships and helps prepare them for standardized tests. The games are short enough so that many students can use the software in a single period. Working in pairs is also effective.

Some of my students were frustrated by the fast speed of the game. The speed can be slowed down, but this change must be made every time the program is booted. It would be helpful if teachers could set and save options for students, such as speed, skill level, and automatic scoring.

Price: $44.95
Policy: $15.50 backup; 30-day preview
Source: American Guidance Service (AGS), Publishers' Building, Circle Pines, MN 55014; 800/328-2560

Ann Dana, Computer Consultant
District 181, Hinsdale, IL

TRADING POST

Computer: TRS-80 Color Computer, Tandy 1000; IBM PC, PCjr (color graphics card required); Commodore 64; Apple II series
Topic: Problem solving
Grade Level: 3–7

Trading Post takes students back to pioneer days when traders bartered goods. In the game, players learn problem solving skills, such as visual discrimination, rule formation, analyzation, and identification of multiple solutions, as they swap items at a trading post to match a prescribed goal. Graphic shapes are used to represent tradeable items.

Two students or teams of students can play. The computer presents a goal of five to eight randomly selected shapes on the screen. Each player begins with five shapes, also chosen randomly by the computer. During a turn, players may add an item to their collection, exchange any of their items according to four exchange rules displayed on the screen, or match the goal.

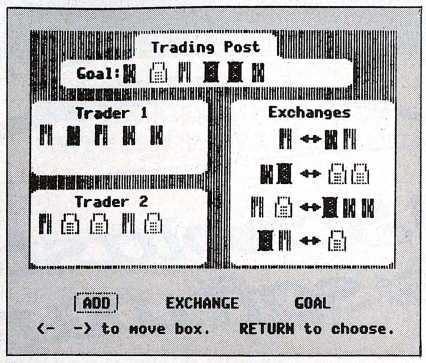
Items added to collections are randomly chosen by the computer. Players may not have more than 12 items at any time in their collections. Exchange rules are graphically displayed and vary according to one of three levels of difficulty. For example, if students choose the Beginner Barterer level, the goal consists of five shapes and exchanges are even. That means that one shape is exchanged for one other shape, two shapes for two others, and so on. In the Assistant Swapper level, the goal is five or six shapes and exchanges may be un-

even, which means that one shape may be exchanged for two, two shapes for three or four, and so on. The goal in the Terrific Trader level consists of seven or eight shapes and exchanges may be even or uneven.

When players match the goal, they score a point. It is not necessary for a player's items to appear in the same order on the screen as the items in the goal. Players may also have extra items in their collection that don't appear in the goal. Winners receive five new shapes for the next game. Losers keep their shapes. The first player to match two goals wins. The winner's name appears on a graphic of the trading post along with a congratulatory message.

Onscreen directions are easy to follow. The documentation is written for the teacher, not the student. It includes an explanation of educational objectives, a description of the program, ideas for using the program in a classroom, and several reproducible worksheets and answer sheets.

My students enjoyed using this program. They especially liked working in groups and discussing their "trades" before activating them. This arrangement requires students to verbalize their thinking process and practice cooperation skills.



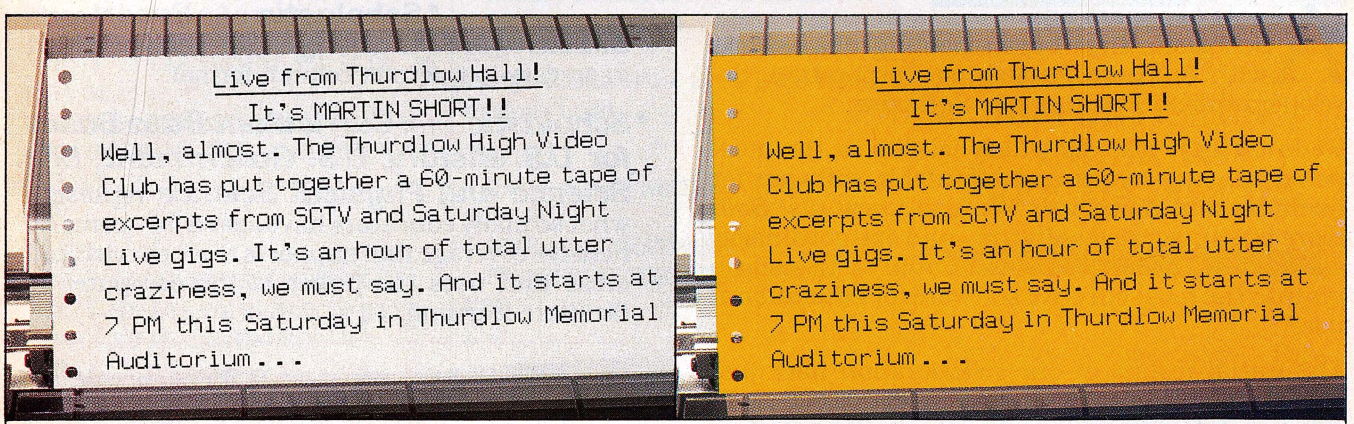
Two students or teams play against each other in Trading Post. *Each side starts with five shapes, and must make appropriate trades to meet the prescribed goal. The first player to match two goals wins.*

I appreciate the fact that the program doesn't force students to compete against a clock. However, it would be helpful if students had to match the shapes in order at the most difficult level of the game.

Trading Post achieves its valuable objectives. It makes good use of the computer and provides immediate feedback to students. Students of all learning abilities should benefit from this program.

Price: $59
Policy: Backup included; 30-day preview
Source: Sunburst Communications, 39 Washington Ave., Pleasantville, NY 10570; 800/431-1934

Ron Baraloto, Instruc. Resource Dept. Montgomery County, Rockville, MD ■



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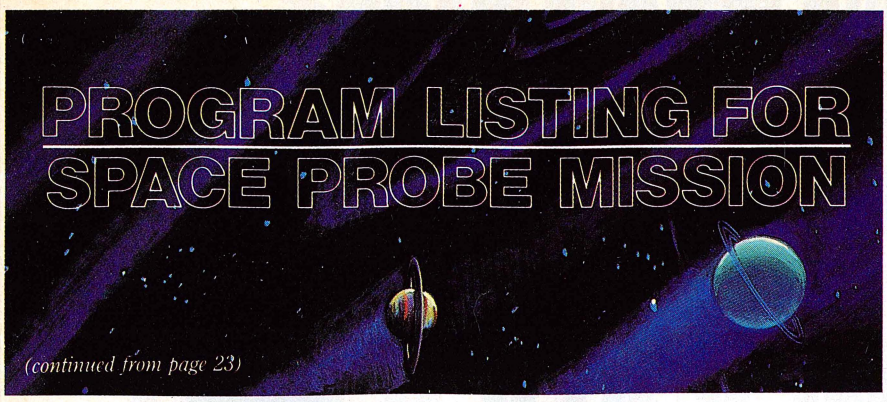

(continued from page 23)

```
TO LEG4
  CS SOLAR.SYSTEM PU SETX -110 SETY
-50
  SETH 200 REPEAT 50 [FLY]
  PR [....TO BE CONTINUED....]
END

TO SOLAR.SYSTEM
  PU HT SETX 130 SETY 0 PD PLANET 1
PU
  SETX 110 SETY 60 PD PLANET .5 PU
  SETX 40 SETY 50 PD PLANET 5.5 PU
  SETX -110 SETY 40 PD PLANET 4.5 PU
  SETX -120 SETY 10 SETH 45 PD FD 95
PU
  SETX -110 SETY -40 PD PLANET 2
END

TO LEG3
  DRAW SOLAR.SYSTEM PU SETX -90
SETY 10
  SETH 190 REPEAT 50 [FLY]
  PR [PREPARE FOR A CLOSEUP OF
URANUS....]
END

TO LEG4
  DRAW SOLAR.SYSTEM PU SETX -110
  SETY -50 SETH 200 REPEAT 50 [FLY]
  PR [....TO BE CONTINUED....]
END

TO WAIT :TIME
  REPEAT :TIME * 25 [ ]
END

TO PLANET :SIZE
  RT 90 REPEAT 36 [FD :SIZE RT 10]
END

TO FLY
  PU ST FD 1 WAIT 10
END
```

Commodore, Krell, and Terrapin Logo Version:

Enter the LAUNCH, JUPITER, SATURN, URANUS, SOLAR.SYSTEM, PLANET, and FLY procedures listed under the Apple Logo version. Then enter the following procedures exactly as they appear.

```
TO MISSION
  DRAW CLEARTEXT PU HT LAUNCH
  JUPITER LEG2 SATURN LEG3 URANUS
LEG4
END

TO COUNTDOWN :NUMBER
  PRINT :NUMBER
  IF :NUMBER = 1 PR [LIFT OFF!] STOP
  WAIT 30 COUNTDOWN :NUMBER - 1
END

TO JMOONS
  SETX -100 SETY 10 PD PLANET .4 PU
  SETX -100 SETY -60 PD PLANET .4 PU
  SETX 110 SETY 90 PD PLANET .6 PU
  SETX 120 SETY 60 PD PLANET .6 PU
  HOME PC 4 .ASPECT .4 PD PLANET 4
  .ASPECT .8 PU PC 1
END
```

Note: Change PC 4 to PC 2 for Commodore Logo.

```
TO LEG2
  DRAW SOLAR.SYSTEM PU SETX 30
SETY 50
  SETH 270 REPEAT 80 [FLY]
  PR [PREPARE FOR A CLOSEUP OF SAT
URN....]
END

TO RINGS
  SETX -130 SETY -80 SETH 55 PC 2 PD
  FD 320 PU
  SETX -120 SETY -70 SETH 55 PC 3 PD
  FD 290 PU
  SETX -110 SETY -60 SETH 55 PC 4 PD
  FD 260 PU
  SETX -100 SETY -50 SETH 55 PC 5 PD
  FD 230 PU
  SETX -90 SETY -40 SETH 55 PC 2 PD
  FD 200 PU PC 1
END
```

Lorraine Hopping is associate editor for *T& C*. ***Tom Lough***, editor of the *National Logo Exchange* newsletter in Charlottesville, VA, wrote the *Space Flight* program. The program was adapted from procedures written by ***Andrea diSessa***, one of the developers of the Logo language. ■

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CONVERSION CHART

HOW TO CONVERT T & C PROGRAMS TO OTHER MACHINES

The *Math Story Problems* listings on pages 46 and 47 are written for the Commodore 64 and the Atari series of computers. Use this conversion chart to adapt the program listing for use on the Apple II series and TRS-80 models of computers. For information on how to use specific commands, refer to your user's manual.

PROGRAM OF THE MONTH: *MATH STORY PROBLEMS*, page 45 (Atari, Commodore)

Apple II Series

These conversions are based on the Commodore program listing.

1. Change line 20 to: 20 HOME:CLEAR
2. Change PRINT CHR$(147) to HOME in lines 20, 250, 420, and 2020.

TRS-80 Series, Color Computer

These conversions are based on the Commodore program listing.

1. Change PRINT CHR$(147) to CLS in lines 20, 250, 420, and 2020.
2. Change PRESS RETURN to PRESS ENTER in lines 200, 400, and 2050.
3. Substitute the following lines for corresponding lines in the Commodore program listing.

```
20 CLS:CLEAR 2000
270 FOR I=0 TO 5:Q=RND(2):Q=Q+1
290 X=RND(NP)
320 FOR I=0 TO 2:A(I)=RND(40)+10
340 FOR I=0 TO 2:A(I)=RND(15)+2
```

4. If you are using a Color Computer, change LL=39 to LL=31 in line 3010 and change LL=39-WL to LL=31-WL in line 3110. If you are using a TRS-80 Model I, III, or 4, change LL=39 to LL=63 in line 3010 and change LL=39-WL to LL=63-WL in line 3110.

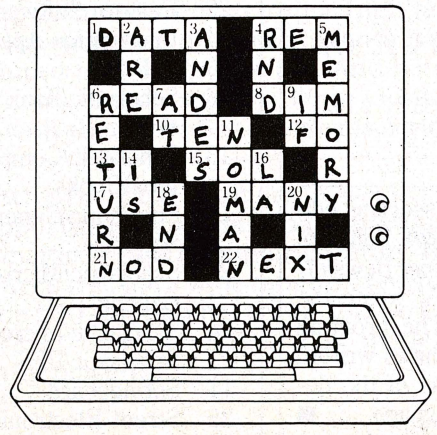
ANSWERS TO "MICRO TIMES"

Computers Fight Forest Fires

Here are answers to the review questions.

1. Lightning strikes; **2.** Trees are tall and are in the open air; **3.** No; **4.** Computerized antennas pinpoint where lightning strikes seconds after it happens. If a fire starts, rangers send fire fighters to the spot right away.

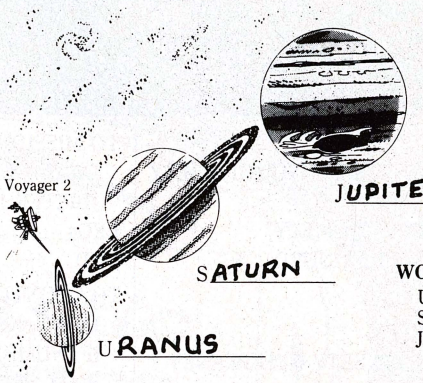
BASIC Micro Puzzle



ANSWERS TO POSTER WORKSHEETS

Primary #1

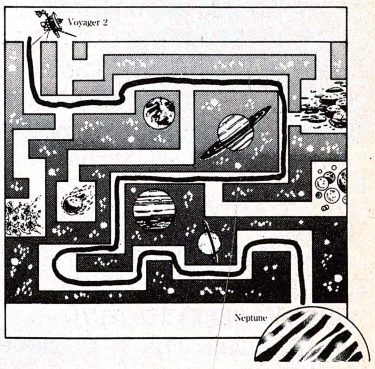
Here are the correct planet names.



WORD BOX
Uranus
Saturn
Jupiter

Primary #2

Voyager 2 should follow this path through the maze:



Intermediate #1

Answers will vary.

Intermediate #2

Jupiter
Date: July 9, 1979
Diameter: 88,700 miles
Temperature: -236° F
No. of Moons: 16
Atmosphere: Hydrogen, helium, ethane, methane, ammonia
Other: Temperature on surface is 34,000° F, volcanoes erupting on Io.

Saturn
Date: August 21, 1981
Diameter: 74,600 miles
Temperature: -285 ° F
No. of Moons: 23
Atmosphere: Hydrogen, helium, ethane, methane, ammonia
Other: Rings are made of ice particles, atmosphere on Titan is nitrogen.

Uranus
Date: January 24, 1986
Diameter: 32,000 miles
Temperature: -357° F
No. of Moons: 15
Atmosphere: Hydrogen, helium, methane
Other: Nine thin rings contain large boulders.

Neptune
Date: August 24, 1989 (projected date)
Diameter: 31,000 miles
Temperature: -360° F
No. of Moons: 3
Atmosphere: Hydrogen, methane, helium, possibly ethane
Other: Some evidence of rings. ■

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